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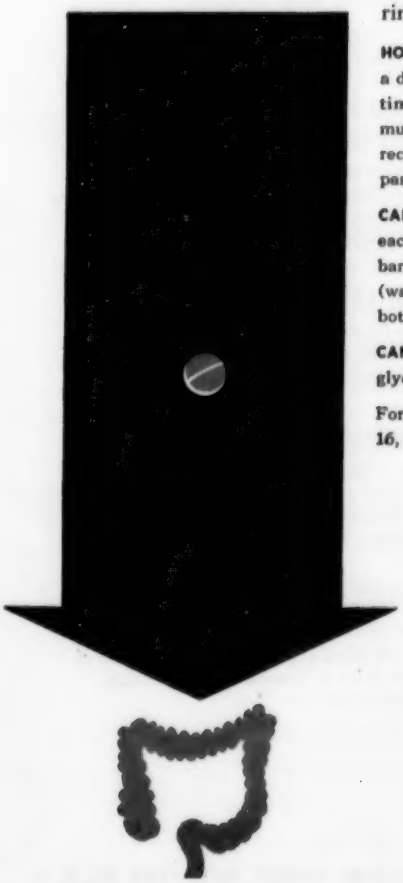

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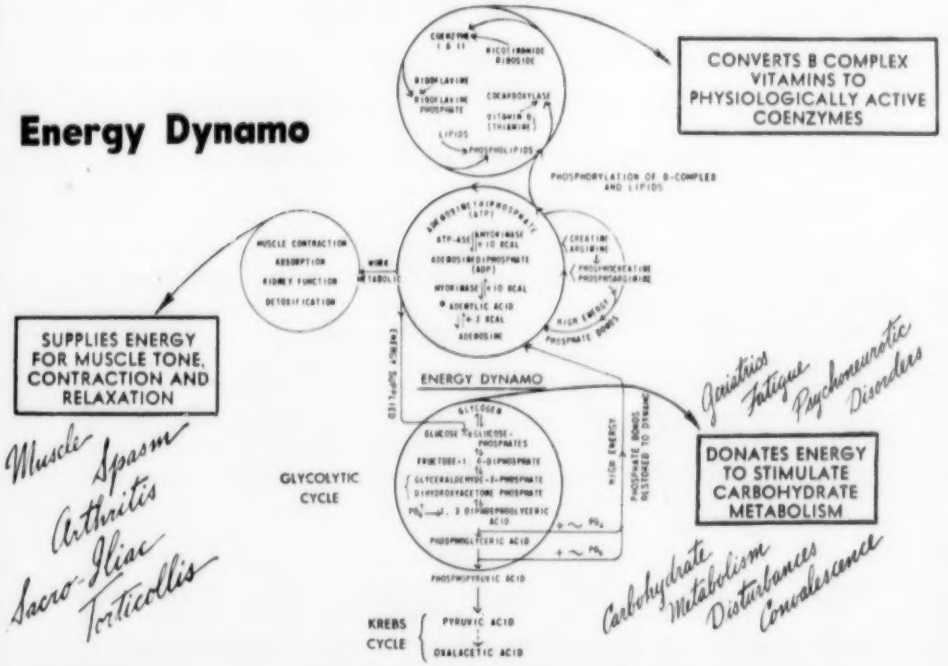

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Comparative Psychopathology of Shock Therapy and Pharmacotherapy

Klaus Hartmann, Joachim Hiob, and Hanns Hippius

PSYCHIATRIC AND NEUROLOGIC CLINIC, FREE UNIVERSITY OF BERLIN
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Since Delay and Deniker introduced chlorpromazine (1952) into clinical psychiatry, the pharmacotherapy of endogenous psychoses has steadily increased in importance. The first encouraging reports in the French literature were soon followed by favorable reports on the therapeutic effectiveness of phenothiazine derivatives in the treatment of psychotic syndromes in the clinical literature of Austria, Switzerland, Germany, and the United States.[1, 3, 5, 11, 12] Next to the synthetic phenothiazine substances, the *Rauwolfia* alkaloids have gained most in importance during the last few years. Encouraged by the studies of Indian psychiatrists with the total extracts of the *Rauwolfia* plant in the treatment of the mentally ill, American, German, and Swiss investigators drew attention to the therapeutic effects of the pure alkaloid reserpine, in the treatment of psychiatric patients.[8, 10, 12, 14]

At the Neurologic Clinic of the Free University of Berlin, since 1953, 300 psychotic patients have been treated with phenothiazine derivatives and 70 with *Rauwolfia* alkaloids. The examination of these patients gave us an opportunity to study particularly the effects of chlorpromazine and Pacatal, a phenothiazine derivative without chlorine.

This paper briefly discusses the psychic effects of chlorpromazine in the treatment of psychotic patients and compares these with corresponding effects in shock treatment.

ANTHROPOLOGIC EFFECTS OF SHOCK TREATMENT AND CHLORPROMAZINE THERAPY

According to von Baeyer, the "anthropologic significance" of a therapy is its effect on the relationship between the patient and the physician. The effects of therapy on the "illness experience" and the "treatment experience" are also anthropologic effects.

The "Illness Experience" in Patients Undergoing Shock and Chlorpromazine Treatments. As long as the patient is able to stand away from his disease in the initial stages, resistance*

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* By resistance is meant "Auseinandersetzung."

to the psychosis is possible (primary resistance). However, as soon as the psychosis overpowers the patient, resistance to reality begins, i.e., resistance to the environment and to the behavior of family and physicians. When the psychosis abates, a new change takes place, i.e., resistance to the psychosis (secondary resistance). The patient finds this sequence of changes extremely confusing, especially when they repeat themselves several times, as in remittent psychoses.

Successful shock treatment interrupts the continuity of this development in a twofold manner. It results in a more or less complete retrogressive amnesia and a more or less abrupt rupture of the psychosis. It obscures the primary resistance of the patient to the psychosis and immediately confronts him with the secondary resistance. The illness experiences of patients who undergo shock treatment are, therefore, discontinuous.

These effects are not seen with the administration of chlorpromazine. This type of treatment maintains the continuity of the patient's experience while leading him gradually out of the psychosis. It preserves the primary resistance to the disease and progressively leads the patient into secondary resistance. Patients treated with chlorpromazine are, therefore, better able to follow their illness experiences than those treated with shock. They live through the realization of their pathologic world and the associated derealization of the environment in the early stages of the psychosis, as well as the reverse process toward its end. The patients' statements as to the development of their hallucinations are especially impressive. These persons are able to relate in detail how, at first, they stood at a distance from their voices, then were overwhelmed, and finally were again at a distance, and how the phonemes became "louder" and then "softer." Thus, the illness experiences of chlorpromazine-treated patients have a greater continuity.

This continuity of the illness experience should be of great importance for the psychologic exploration of psychoses. While the psychologic resolution of a shock-treated psychosis is made more difficult by the fact that the illness experience of the patient is deeply "buried" by the therapeutic amnesia, chlorpromazine treatment allows observation of resistance. With this therapy, the physician is better able to investigate the clinical course of the disease. The continuity of the illness experience possibly constitutes no gain to the patient.

The Patient's "Treatment Experience" during Therapy with Shock and Chlorpromazine. Shock treatment is attended by a discontinuity of the treatment experience. This discontinuity corresponds to that of the illness experience in patients undergoing shock treatment. Patients treated with shock are excluded from the treatment experience. The insulin coma and the electric convulsions completely escape the patient's control. He feels overruled and "sold out."

Chlorpromazine treatment, however, provides a continuity of the illness experience. Patients treated with chlorpromazine are able to observe the effects of the drug. Their integrity appears to be encroached upon to a lesser degree. They feel that they are not being overruled, but that they have control over themselves. Moreover, shock treatment is regarded as a forcible measure. The isolation of shock patients before treatment only serves to strengthen this impression in the subject and his fellow patients. Therefore, there is a recurrent and increasing resistance to shock treatment.

Chlorpromazine treatment, on the other hand, has an internal quality. It does not constitute a drastic measure or a cure by force. Injections and tablets are given, and there is no sudden change in the subjective state; chlorpromazine treatment, therefore, generally

meets with less resistance. If, however, toxiphobia should lead distrustful patients to refuse chlorpromazine treatment, therapy can be initiated with the administration of hidden doses of the drug (i.e., in applesauce); after some time, treatment may be continued in the usual manner without meeting too much resistance.

Cases in which shock treatment develops a defense mechanism by the patient against the physician are not rare; this makes mental care during treatment more difficult. Moreover, this care is frequently made impossible by the interruption of the consciousness continuity in shock treatment. Chlorpromazine therapy, on the other hand, permits the development of a better relationship of trust between the patient and his physician than does shock treatment. Since chlorpromazine therapy permits a continuity of experience, it satisfies the prerequisites of continuous psychiatric care.

SOCIOLOGIC EFFECTS OF SHOCK TREATMENT AND CHLORPROMAZINE

The sociologic significance of a treatment can be measured by its effects on the relationship between the patient and those surrounding him. The repeated interruption of continuity in experience and consciousness caused by shock treatment hinders not only the relationship between patient and physician but also that between the patient and his human environment. The lack of understanding among psychotic patients in the clinic, which results from the disease itself, is increased by the amnesic phases of shock treatment. After returning to their home surroundings, some patients begin to suspect, from the behavior of friends and neighbors, that they can no longer be full-fledged members of the human community since they have undergone shock treatment. After the psychosis abates, the knowledge of having undergone convulsive shock therapy lingers in many patients and becomes interwoven with the thought of having been a "mental patient."

Chlorpromazine therapy results in better human relationships among the patients soon after its institution. The patient may almost always remain with others from the start of treatment, since the strong sedative effect of chlorpromazine rarely requires isolation. The obligatory strapping to the bed of agitated patients is avoided in almost all cases. The autistic desire for isolation is lessened, and excitation is dampened; thus, chlorpromazine therapy promptly eliminates pathologic conditions that would destroy the human relationship among patients in the institution. The atmosphere of the ward changes in such a manner that the external conditions facilitate to a considerable degree the forging of mutual relationships among the patients. The first stage of treatment, accompanied by dizziness, is followed by a specific chlorpromazine effect, that is, an increased desire for human dependence and an affectionate warmth that favors the exchange of experiences among patients.

The atmosphere of the wards, which often resembles a private clinic, spares many patients from being considered by their relatives as "mentally ill." Psychically, the patients are also less burdened if they merely undergo a "sleep treatment."

Finally, it should be emphasized that a patient who has relapsed will more frequently return of his own accord to the institution if, at the beginning of the psychosis, there still is a remnant of understanding of the disease. The patient shies away less from a treatment with tablets and injections than from shock therapy. Also, the patient's relatives, in most cases, make earlier efforts for his admission, knowing that no "secret force treatment" will be carried out.

A review of the aspects discussed up to this point shows that modern pharmacotherapy of psychoses, aside from its therapeutic benefits in the narrower sense, seems to be destined to lift psychiatric treatment from the isolated position to which it had been unjustly relegated, away from other specialized fields of medicine. This alone would constitute great progress, not only for the clinical psychiatrist, but especially for the patients.

PSYCHOLOGIC AUTO EFFECTS OF SHOCK TREATMENT AND CHLORPROMAZINE THERAPY

"Psychologic auto effects" of a treatment are the changes of basic psychic functions that occur during therapy and are more or less closely related to the duration of treatment. They may also be called "direct therapeutic effects" or "effects of short duration." They can also be demonstrated in healthy individuals or at least can be postulated as demonstrable.

The psychologic auto effects of shock therapy have been extensively reported by von Baeyer and Weitbrecht.[2, 15] We have published another paper[6] on comparisons between the psychologic auto effects of chlorpromazine therapy and those of shock treatment. Our studies showed parallels and differences in the two therapeutic methods. Both treatments have in common the organic nature of their psychologic effects: As somatic treatments, both methods result in a characteristic organic psychosyndrome. Both treatments differ in the dynamics and the intensity of their psychologic effects: In patients undergoing shock treatment, these are more or less acute and more or less marked. They appear more slowly and are comparatively milder in patients treated with chlorpromazine.

With chlorpromazine, the following were particularly observed: disturbances of consciousness (drowsiness, various degrees of daze); disturbances of memory functions (decreased ability to fix impressions and to reproduce fixed impressions; occasional disturbances of memory); disturbances in drive (decrease of vital drive; rare increases in drive, especially at the beginning of treatment); disturbances of feeling (emotional indifference; occasional dysphoric and euphoric states); sensory disturbances (disturbances of feeling); and disturbances of thoughts (disturbances of form and content of thoughts, appearing as secondary effects of treatment, i.e., effects of the primary depression of drive or the decrease of alertness).

CLINICAL EFFECTS OF SHOCK TREATMENT AND CHLORPROMAZINE THERAPY

The therapeutic effects that outlast the auto effects are classified as the "clinical effects" of treatment. They can also be classified as "indirect therapeutic effects" or "after effects." The clinical effects of a treatment are seen in the lasting influence they exert on the psychopathologic symptoms.

The clinical effects of a treatment basically constitute the most important problem faced by clinical psychiatry. However, since neither the pathogenesis of endogenous psychoses nor the mechanisms of action of the treatments in use are known, it is very difficult to evaluate the clinical effects of a given treatment. It can be said with certainty, however, that the success of all the tested methods of somatic treatment need not be judged only by their psychologic effects. One is obliged to accept important components of management in the somatic sphere. Moreover, it is not possible to accept a causal therapeutic success in psychotic processes so long as its effect on the states of defect caused by psychotic

processes is not certain. There is as yet no proof that either shock treatment or chlorpromazine therapy prevents the growth of a defect in a functional psychosis. Therefore, one can only be content to study the clinical effects of a treatment by correlating all empiric observations of somatic and psychic phenomena, so that perhaps at a later time it may be decided to what extent the somatic and psychic effects of the treatment are related to its therapeutic success. A review of the clinical effects observed with shock treatment is provided by von Baeyer and Weitbrecht.

It is not yet possible to make a similar review of the clinical effects of chlorpromazine therapy, since the findings of the past three years are still contradictory in many aspects.* The available data on the effects of chlorpromazine on the psychopathologic symptoms are too scanty to determine the relationship between the psychologic auto effects and the clinical effects. Janzarik[9] has voiced the supposition that any somatic treatment of an endogenous psychosis should preferably be carried out in the direction of its psychic auto effects. He, therefore, believes that it is possible to expect good therapeutic results with chlorpromazine therapy, especially in patients whose clinical picture indicates a preference for soothing effects on the basic psychic functions (drive, emotion, and consciousness). Therefore, one should expect good results in all psychotic syndromes with increase of drive, excessive emotional reactions, and delusional excitation, that is, with a generally productive symptomatology. On the other hand, the achievement of success with convulsive shock therapy is more likely in syndromes in which a stimulation of drive and emotion appears desirable, since convulsive shock therapy can be best employed, as we cannot discuss in greater detail here, for its stimulating effects on the basic psychic functions.

These observations can be supported by our own clinical findings with chlorpromazine therapy. We saw the best results in cases of productive schizophrenic syndromes. In cyclophrenias we virtually obtained improvement only in patients with manic clinical pictures, whereas a deterioration set in at the end of treatment in the majority of depressive patients.[7] Combined shock and chlorpromazine treatment was frequently found to be effective in such patients.

If, after prolonged observations, a comparison between chlorpromazine treatment and shock therapy should reveal an identical effect in schizophrenic and manic syndromes, the former would still be preferable in view of the anthropologic and sociologic effects we previously discussed. Moreover, chlorpromazine treatment is superior to shock therapy because of its many fields of application. Chlorpromazine may also be used in the treatment of older and debilitated patients. After clinical treatment is completed, chlorpromazine may be given in small maintenance doses for virtually unlimited periods.

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Quarterly Review of Ophthalmology Revised for Entire Medical Profession

The new, enlarged *Quarterly Review of Ophthalmology*, revised to include material of interest to the entire medical profession, appears for the first time in its new format on pages 150 through 174 of this issue of International Record of Medicine. A variety of interesting sections, prepared under direction of Arnold S. Breakey, M.D., Executive Editor of the *Quarterly Review*, is presented, including an original article, "Why Blindness? An Australian Viewpoint," by J. Ringland Anderson, M.D.; "Ophthalmology around the World: Letter from Venezuela," by José Manuel Espino, M.D.; "Current Research: Glaucoma," by Ralph Z. Levene, M.D.; ophthalmology abstracts; a questions and answers section, conducted by George Z. Carter, M.D.; a case report on "Epidemic Keratoconjunctivitis," by Dahar Cury, M.D.

The objective of the *Quarterly Review of Ophthalmology*, as stated in its foreword, is "to bring together in one publication a concise record of current happenings, both national and international, in this field."

The Exophthalmogenous Factor in the Serum

Evaluation and Practical Use

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In 1945 Albert[1] proved that exophthalmos could be produced in some fish, the *Fundulus heteroclitus*, by injecting them with extracts from the anterior lobe of the hypophysis. This has been confirmed in the past few years and has been thought to be due to the action of the thyrotropic hormone[4] or the effect of a supposed exophthalmogenous factor of the hypophysis.[2]

Recently, Dobyns and Wilson[3] and Silvestrini and Pasargiklian[5] have proved that the serum of some patients with exophthalmos has an exophthalmogenous effect on the *Fundulus* similar to the effect of the hypophyseal extract, and they have suggested that the study of this effect on the serum of fish might be of interest in the diagnosis of hyperophthalmopathic forms of Graves-Basedow's disease.

In our practice we have had the problem of making the diagnosis of exophthalmos without the presence of thyroidal alterations, deciding the prognosis of a basedowian proptosis of rapid course, or determining the possibility of successful treatment of a residual exophthalmos (last sequela of a hyperthyroidal syndrome). The study of the exophthalmogenous power of the serum presents the possibility of solving any of these three problems. Unfortunately, however, it is difficult to obtain the *Fundulus* for investigation.

After a series of experiments we found that the *Carassius auratus* var. *japonicus* also develops exophthalmos when injected with small doses of hypophyseal extract or with the serum of some patients. These fish are not difficult to obtain, they tolerate injection very well, and they can live for a long time under laboratory conditions.

We will present here the method of determining the exophthalmogenous power of the serum in these fish and the interpretation of results.

METHOD

Eight specimens of *C. auratus* of the same size (10 to 12 cm.) and age (1 to 2 years) are placed in two broad-bottomed containers of glass, plastic, or porcelain with a capacity of 15 liters of water. Each container holds four fish, of which three are to receive the injections of serum, the fourth being used as a control.

We always perform the test in duplicate and with recently obtained serum.

The serum is injected in doses of 0.25 cc. into the celomic cavity, at regular intervals of six hours, until a total dosage (six to eight injections) of 1.50 to 2.00 cc. has been given. An injection of more than 0.25 cc. is not always well tolerated by the fish and does not increase the number of positive results.

The control fish are injected with the same amount of serum obtained from a healthy or a psychoneurotic person.

FIG. 1. Evaluation of the exophthalmogenous power of the serum. Left: A fish injected with serum from a patient with edematous exophthalmia. Result ++++. Right: The control fish, injected with serum from a normal person. The difference in ocular protrusion is remarkable.

RESULTS

Every six hours, at the time of injection, the eyes are examined and compared with those of the control fish in the same container. The examination is performed under strong light, and the opinions of three different observers are recorded. A result is considered positive only when all three observers are in agreement.

Ocular protrusion usually starts after the fish receive the fourth injection of serum, and keeps increasing thereafter. We continue to examine the fish when giving each injection and also six hours after the eighth (the last) injection. A result is considered positive when at least two fish from the same container present an increase of protrusion as compared with the control (figs. 1 and 2).

Sometimes after the fifth injection there is no doubt that the result is positive; in such a case the injections do not need to be continued. When the result is doubtful (or negative) we repeat the test another day with different fish. The same *Carassius* may be used again after three weeks for another test.

We have established a scale of positivity, ranging from 0 to ++++ according to the amount of exophthalmos, the precocity of its appearance, and the number of positive fish. A ++++ reaction denotes a marked increase in exophthalmos in the six fish injected with serum of the patient and that this occurred with a total dose of serum of 1.50 cc. or less. The +++ and ++ reactions correspond to results obtained with from 1.50 to 2.00 cc. of serum in at least four of the six fish. A +

FIG. 2. The serum from a patient with Graves-Basedow's disease of hyperophthalmopathic type was injected in the fish at the right; note the predominating unilateral exophthalmos. The fish at the left is the control injected with serum from a normal subject.

FIG. 3. Ophthalmoplegia with moderate edematous exophthalmos in a patient with a slight thyrotoxic syndrome and severe generalized myasthenia. The intense exophthalmogenous activity of the serum confirmed the diagnosis.

reaction indicates a delayed, scanty positivity in at least three *Carassius*. The interpretation in this last case can be considered doubtful.

PRACTICAL APPLICATION OF THE METHOD

We have examined 14 patients in accordance with the described technique (a total of 22 investigations). Following are results obtained in these cases.

Graves-Basedow's Disease. Six patients of our series presented a typical and complete Graves-Basedow's disease, with basal metabolism between +23 and +62 per cent and protrusion between 14 and 32 mm. In 3 patients of this group the result was +++ or ++, that is, the serum definitely had exophthalmogenous power. These cases were related to a severe form of thyrotoxicosis with intense edematous exophthalmos.

In another patient, similar to the preceding cases, the reaction was doubtful or negative, but after 29 days' treatment with methylthiouracil, the reaction was ++; this change coincided with an improvement of the thyrotoxicosis, a fall of the metabolism from +47 to +13 per cent, and a slight increase in exophthalmos. In the last 2 patients of this group the reaction was totally negative; 1 of them had a palpebro-retractile exophthalmos, with a minor degree of ocular protrusion (14

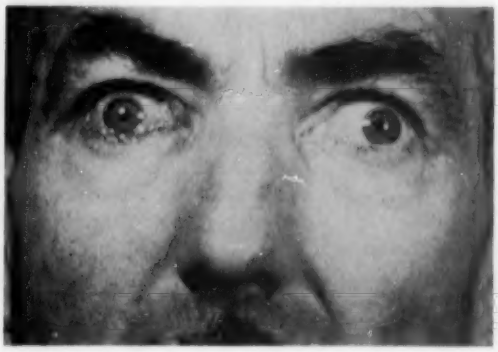

FIG. 4. Same patient as in figure 3. Ophthalmoplegia is complete at the right. The left eye can be rotated slightly in abduction.

Figs. 5 and 6. Exophthalmos in the right eye with intense palpebral and periorbital edema, without signs of thyroidal dysfunction. The reaction in the *Carassius* was intensely positive.

mm.). The last case was a relapsing form of hyperthyroidism with long-standing and fixed exophthalmos not benefited by any form of treatment.

Exophthalmic Ophthalmoplegia. A patient in our series had a mild thyrotoxic syndrome, without goiter, with moderate exophthalmos (17 to 18 mm.), total ophthalmoplegia (figs. 3 and 4), and a generalized myasthenic syndrome not benefited by therapy. The diagnosis was clarified when an exophthalmogenous power of +++ was found in the serum.

Simple Nodular Goiter. In a patient with a long-standing polynodular goiter, without exophthalmos or hyperthyroidism, the reaction to the test was negative.

Toxic Nodular Goiter. This patient had a polynodular goiter, with hyperthyroid manifestations, metabolism of +38 per cent, and no exophthalmos. The reaction was negative. After remission of the thyrotoxic syndrome and fall of the metabolism to −5 per cent, the reaction was +; it became +++ (we shall refer to this later) 32 days after strumectomy at the same time as the appearance of hypothyroidism.

Essential Exophthalmos. We include in this group a boy with unilateral exophthalmos, without endocrine alterations, in whom orbital hemangioma was later diagnosed. The reaction to the test was negative.

The second patient in this group was a 30 year old woman (figs. 5, 6, 7, and 8). She had always been in good health until the right eye started to protrude. The exophthalmos increased until spontaneous luxation was produced. There was also peripalpebral and periorbital edema and slight thyromegaly without signs of thyroidal dysfunction (basal metabolism, +1 per cent; plasmatic protein-bound iodine, 5.4 μg.). Roentgenograms of the orbit were negative. Testing with the *Carassius* gave a ++++ reaction. In accordance with this result, the diagnosis of hypophyseal ophthalmopathy was established. After 1200 r to the hypophysis, the exophthalmos had almost disappeared, and a small, angular tarsorrhaphy was sufficient to avoid luxation of the globe. By that time the reaction had become +.

Postoperatorive Myxedema. The test was performed on 3 patients who had stru-

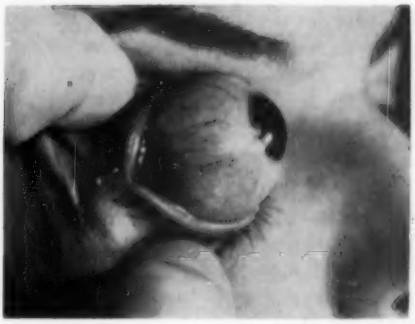

FIG. 7. Luxation of right ocular globe provoked by slight pressure on the lids (same patient as in figures 5 and 6).

mectomy and had signs and symptoms of thyroidal hypofunction. In 1 of them the test gave a +++ and in another a ++ reaction; however, neither one had exophthalmos. The third patient of this group underwent thyroidectomy because of Graves-Basedow's disease; before operation a slight palpebro-retractile exophthalmos was present and the exophthalmogenous power of the serum was negative. Two months after operation the patient had myxedema and the ocular protrusion had increased 3 mm. Testing with the *Carassius* gave a ++ result.

Effects of Treatment. We have previously referred to the disappearance of the exophthalmogenous power of the serum after irradiation to the hypophysis. In patients with postoperative myxedema, the administration of 0.20 Gm. of desiccated thyroid daily caused a negative result of the test.

COMMENT

Our investigations show that in the serum of some patients with exophthalmos or postoperative myxedema there exists a factor capable of producing ocular protrusion in the *Carassius*. In our early experiments we also demonstrated that these

FIG. 8. The same patient of figures 5, 6, and 7, after 1200 r to the hypophysis. There was reduction in the exophthalmos and palpebral edema; the exophthalmogenous power of the serum disappeared almost completely.

fish react in the same way to the intracelomic injection of total extract of the hypophysis and thyrotropic substances. We conclude from this that it is very probable that the exophthalmogenous power of the serum originates in the hypophysis and is similar or identical to the thyrotropic hormone.

Other studies confirm that the exophthalmogenous factor and the thyrotropic hormone are identical.

Study of the thyrotropic power of the serum in some patients has demonstrated that there is absolute conformity between its stimulating action on the thyroid and its exophthalmogenous power.

The test on the *Carassius*, by the method we have established, is a diagnostic means in hypophyseal exophthalmos and a method for the rapid evaluation of thyrotropic hyperfunction.

SUMMARY

In the serum of some patients with Graves-Basedow's disease, postoperative myxedema, or hypophyseal ophthalmopathy, there is a factor capable of producing exophthalmos in the *Carassius auratus* var. *japonicus*. The serum of these patients, recently obtained, is injected in doses of 0.25 cc. at intervals of six hours. When the serum has exophthalmogenous activity, the eyes of these fish begin to protrude from the fourth to the eighth injections.

This exophthalmogenous factor of the serum is probably identical to the action of the thyrotropic hormone.

Clinical cases in which the test gave very interesting results for diagnosis and treatment are reported.

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An Approach to the Treatment of Progressive Muscular Dystrophy

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In a previous paper[1] the theory was presented that the pathogenesis of progressive muscular dystrophy is an inherited or acquired disturbance in the combination between the iron-actomyosin and the adenosine triphosphate, which causes contraction of muscle. This theory is based on investigations concerning metabolism in normal muscle as well as in progressive muscular dystrophy. The creatinuria in progressive muscular dystrophy is explained by the fact that, because of the reduced amount of adenosine triphosphate, the consumption of creatine is reduced.

Analytic investigations in progressive muscular dystrophy have demonstrated that the iron and the content of the adenosine triphosphate show abnormalities. It has also been demonstrated that there is a reduction in the amount of myoglobin[2] and myosin.[3] Analysis has shown that there is a reduction of the non-hemin-bound iron when this is estimated in fat-free muscles.[2] Indovina[4] found a low serum iron in patients who manifested very advanced muscle dystrophy. When cytochrome C was given to patients who had progressive muscular dystrophy, a considerable diminution in the amount of creatine in the urine could be seen.[5] Beinert[6] has shown, by means of isotope experiments with iron, that 24 hours after the injection there was none of the injected cytochrome C intact in the body, and the iron was distributed throughout the various organs. In investigating progressive muscular dystrophy, Milhorat[5] found that he could bring about the same diminution of creatine in the urine by giving an iron salt instead of cytochrome C. Also, later investigations have shown that the presence of iron is necessary for the phosphorus uptake of actomyosin.[7] Part of the iron in muscle occurs in an as yet incompletely understood combination with the actomyosin, and this combination can initiate a contraction on addition of adenosine triphosphate.[8]

When energy is used up in muscle, the adenosine triphosphate is broken down into adenosine monophosphate[9] and is built up again by means of energy, some of which is generated at the breakdown of creatine phosphate. This last process causes the excretion of creatinine in the urine.[10] Certain investigations in connection with progressive muscular dystrophy have shown that there is a reduction of adenosine triphosphate per gram of muscle.[11] Others[12] have found that even if there is a reduction of the absolute quantity of adenosine triphosphate, there is at the same time a relative increase when the investigations are based on the quantity of fully acid-soluble phosphorus. But this only seems to indicate that the creatine and phosphocreatine disappear more quickly than the adenosine triphosphate. Presumably the essential point is that the total content of the adenosine triphosphate in the muscle is reduced and that the active muscle mass is replaced by fat and connective tissue.

In view of the significance of iron and adenosine triphosphoric acid for the function

of muscle cells, it seemed that it might possibly be of some value to try to supplement these combinations in progressive muscular dystrophy. However, since in the theory for the pathogenesis of progressive muscular dystrophy described herein it is presumed that it is a matter of an inherited or acquired disturbance in the combination between the iron-actomyosin and the adenosine triphosphate, it must be emphasized that only part of the combination between the iron-actomyosin and the adenosine triphosphate is added.

The adenosine combination added was the mixed adenylic acids a and b, since in their experiments Brown et al[13] had shown that in parenteral administration of the mixed adenylic acids a and b the latter were converted into muscle adenosine diphosphate and adenosine triphosphate.

On the basis of these investigations it was considered justifiable to attempt to treat patients with progressive muscular dystrophy by parenteral administration of an iron combination of the mixed adenylic acids a and b.

CLINICAL MATERIAL

The study included 8 patients with progressive muscular dystrophy. Biopsy of muscle and electromyography were used in an attempt to confirm the diagnosis.

The patients received daily intramuscular injections of an iron combination of the mixed adenylic acids a and b (Ironyl*), the composition of which was stated as follows: 2820 mg./100 mg. adenosine-3-monophosphate, 252 mg./100 mg. phosphate, 1110 mg./100 mg. adenine, and 423 mg./100 mg. iron in the form of a ferric combination. One ml. of this solution was administered daily.

CASE HISTORIES

Case 1. The patient was a girl aged 17, the sixth of seven children. There were no known cases of muscle disease in the family. She was able to walk unsupported at the age of 12 months. The patient's disease began when she was about 5 years of age in the form of weakness of the muscles of the back. Since then the disease had progressed slowly. The patient was able to walk alone at a slow rate for half an hour. Objective examination showed muscle atrophy, which was most pronounced in the shoulders, back, and proximally in the limbs. Moreover there was rather marked kyphosis and lordosis. There was no pseudohypertrophy. Repeated muscle biopsies miscarried, but electromyography suggested a myogenic origin of the disease. The patient has received daily injections of the described preparation for three and one-half years. The clinical condition and electromyography remained unchanged.

Case 2. The patient was a girl aged 17, the second of three children. There were no known cases of muscle disease in the family. The patient was able to walk unsupported at the age of 15 months. Her disease was first noticed when she was about 6 years of age; the first symptom was weakness of the lower limbs and the back. For one year the disease progressed, but after that it was stationary until she was 15 years old, after which it progressed, and at the age of 16½ the patient was no longer able to walk alone and had to be supported by two persons. The objective examination before the injections were given showed atrophy of the muscles of the shoulder, pelvic, gluteal, and back regions, and to a lesser extent of the muscles of the lower arm and hand. Moreover, there was lordosis and scoliosis. There was no pseudohypertrophy. Muscle biopsy showed muscular atrophy of peripheral origin, and electromyography indicated a myogenic origin of the disease. The patient has received daily injections for three and one-half

* The trade name of Physiological Chemicals Co., Inc., for an iron combination of the mixed adenylic acids a and b is Ironyl.

years. The condition remained stationary, or perhaps slightly improved. Muscle biopsy and electromyography remained unchanged.

Case 3. The patient was a boy aged 8 years. There were no diseases of muscle in the family. The patient was an only child. His musculature was said to have always been weak. He was able to sit without support at the age of 6 or 7 months, and could walk unsupported at the age of 16 months. However, the gait was always of the waddling type, with the forefoot turned inwards. Moreover he had been unable to sit up unaided and had been able to stand up from the lying position only by climbing up his legs. The condition had remained unchanged until he was 5 years old, when the gait became worse, and he was more easily fatigued by walking. He experienced increased difficulty in rising, and the power of the muscles of the back decreased. After that the condition had progressed slowly. The muscle power was reduced in the upper limbs, back, and thighs. There was some pseudohypertrophy of the calves. He continued to walk with a waddling gait, and on walking he showed marked lumbar lordosis. Muscle biopsy showed the presence of a muscle dystrophy of myogenic origin, with pronounced connective tissue hypertrophy. Electromyography supported the diagnosis. The patient has received daily injections for five years. During this period the clinical condition, muscle biopsy, and electromyography have remained unchanged.

Case 4. The patient was a boy aged 4 years, the second of two children. There were no similar cases in the family. The child is said to have always been very flaccid. Not until the age of 12 months was he able to raise his head while lying on his back, or roll over. At the age of 14 months he was able to sit unsupported, and he could support his own weight at the age of 21 months. Not until he was nearly 3 years old could he walk unsupported, but he was still unable to sit up or rise to the standing position. There were no periods of rapid progression of the disease. Objective examination showed that except for insignificant reduction of power there was no demonstrable abnormality of the upper limbs. On the other hand, the lower limbs were flaccid, with little power, but without pseudohypertrophy. There were no contractures. Muscle biopsy showed that it was a case of muscle dystrophy of myogenic origin, and electromyography confirmed this. The patient received daily injections for one year. The clinical condition, muscle biopsy, and electromyography remained unchanged.

Case 5. The patient was a boy aged 14. There had been no similar disease in the family. He was the first of two children. He walked at the age of 12 months but had always had a tendency to fall. When he was 3 or 4 years old his mother noticed that he could not run as well as other children his age. The condition had progressed steadily through the years, with perhaps a somewhat more rapid progression between the ages of 10 and 12. At the start of the investigation there was some atrophy of the shoulder, back, gluteal, and thigh musculature. There was slight pseudohypertrophy of the calves. He could get up from the floor by turning over and rising, with a tendency to climbing up his legs. He could turn over from his back to his stomach without using his arms. He could raise his arms without effort and raise his legs extended through 45 degrees. He was able to get up from a chair without supporting himself with his arms. The gait was rather dragging, but not rocking. There was moderate scoliosis in the thoracic region. There was slight pseudohypertrophy of the calves. Muscle biopsy showed muscle dystrophy of peripheral myogenic origin, and electromyography indicated myogenic atrophy. In the subsequent two and one-half years he received daily injections. At the end of this period the only demonstrable change was that he had to rest a hand on his knee when getting up from a chair. Muscle biopsy and electromyography remained unchanged.

Case 6. The patient was a boy aged 7 years. There had been no similar diseases in the family. He was the first of two children. He began to walk at the age of 20 months, but in the following two years the gait remained uncertain and tottering, and he frequently fell. Not until his fourth year did the gait become more stable, though it was still rather stumbling, and there was slight lordosis of the lumbar region. There were no periods of rapid progression of the disease. The muscles of the shoulders and of the upper limbs were slightly atrophic. Moreover there was atrophy of the gluteal muscles. There was pseudohypertrophy of the calves. Muscle biopsy miscarried. Electromyography showed no definite abnormality. During the subsequent year he received daily injections, and the condition remained unchanged.

Case 7. The patient was a boy aged 13 years, the first of three children. There had been no similar cases in the family. Development was said to have been normal in all respects until the patient was about 4 years of age. The parents then noticed that he had difficulty in walking up stairs and often fell over. Since then the condition had gradually worsened. He was now unable to walk. There was atrophy of the

shoulder, back, and gluteal musculature. The calves were markedly hypertrophic. Muscle biopsy showed very advanced muscle dystrophy, and electromyography indicated atrophy of myogenic origin. He has received daily injections for two years. The condition has remained unchanged, or has perhaps improved slightly. Muscle biopsy and electromyography remained unchanged.

Case 8. The patient was a boy aged 12 years. He was an only child. A male cousin of the father's mother has muscular dystrophy. The patient started walking at the age of 11 months, but the gait had always been uncertain. When he was 7, the condition deteriorated considerably, and two years later he was no longer able to walk. After that the condition had gradually worsened. The patient was very adipose. He was unable to get up from a prone or supine position. There was marked atrophy of the musculature of the shoulder, back, and gluteal regions, and proximally in the limbs. The calves were markedly pseudohypertrophic. Muscle biopsy showed muscle dystrophy of peripheral origin. Electromyography was not performed. The patient has received daily injections for two years. The clinical condition and muscle biopsy have remained unchanged.

DISCUSSION

What can be demanded of a treatment for progressive muscular dystrophy? It may not be justifiable to presume that in this disease the muscle cells can regenerate when the greater part of their structure has been damaged. Denny-Brown[14] believes that there is a defect in the process of growth of myofibrils, so that regeneration ends in regression after the first stage of nuclear proliferation. Moreover, it must be considered that in the investigations carried out here only one part of the combination between the iron-actomyosin and the adenosine triphosphate is supplemented.

In the nutritional muscular dystrophy that can be produced in experimental animals by means of vitamin E deficiency, the process of regeneration is admittedly not only extremely active, but is also completed by abundant production of myofibrils.[15] On the other hand, vitamin E has no effect on progressive muscular dystrophy in man, nor does it diminish creatinuria.[16, 17] In spite of the great similarity between the two diseases, however, the fundamental difference between them is thought to lie in the fact that progressive muscular dystrophy is presumably due to a reduced content of adenosine triphosphate in muscle, while the nutritional muscular dystrophy in animals is supposedly due to a disturbance in the functions of the adenosine triphosphatase. Correspondingly, Kalckar[12] has not found any change in the adenosine triphosphate content in the affected muscles in animals with vitamin E deficiency.

In progressive muscular dystrophy, creatinuria is the chemical abnormality that has been given special attention. However, this sign is not necessarily pathognomonic of the disease, as it may be absent, especially in the early stages.[5] Moreover, creatinuria is found in other diseases of muscle and in spinal muscle atrophies. Therefore, even if creatinuria is not specific for progressive muscular dystrophy, the frequent appearance of this sign and the frequently highly raised values have come to be regarded as important in the diagnosis of the disease and in research on its pathogenesis.[18–20]

However, investigations carried out by, among others, Taselaar[21] have shown that creatine and creatinine excretion is not a reliable criterion for assessing the value of a treatment. Furthermore, other investigations have shown that creatine excretion may occur in adolescent boys[22] and girls,[23] and several of the patients studied here

belonged to this age group. Also, there may be a relatively great day-to-day variation in creatine excretion.[24] Because of all these factors in creatine and creatinine excretion, we tried to use other methods in assessing the value of the treatment.

In testing the efficacy of the drug employed, physical examination combined with measurement of the patient's abilities was used. In addition, note was made of the nature of the course of the disease in the period immediately preceding the start of treatment. For reasons of economy the number of patients was small, but on the other hand the time during which they received treatment is considered to be of such duration that the results gain significance. However, the course of the disease may be unpredictable, and there may be long periods of apparent nonprogression.

In assessing the results found here it might have seemed of value to have used drug or placebo in a randomized fashion. However, since it had been decided that in order to reach a final assessment of the value of the treatment a comparison should be made between the survival time under this treatment and that found in earlier investigations,[25, 26] we thought it justifiable to omit placebo investigations. This could be done because nearly all the patients in those earlier investigations had received treatment with several other drugs, so that there had been use of placebos in those patients in the series from which the average survival time for this disease has been estimated.

SUMMARY

By way of experiment 8 patients with progressive muscular dystrophy have been treated for a period of several years with daily injections of an iron combination of the mixed adenylic acids a and b. The result of these investigations is that it is justifiable to presume that in certain cases it is possible to check the progression of the disease by means of this treatment. It is intended to procure decisive proof of the value of this treatment through a comparison with the average survival time stated for these patients.

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SYMPOSIUM ON MEDICINE AND WRITING

The Symposium on Medicine and Writing that appeared in the November 1956 issue of International Record of Medicine has been published this month as a Monograph. The articles included in this Monograph are: "The Editing of a Modern Medical Textbook" by Russell L. Cecil; "Plain Talk and Clear Writing" by Morris Fishbein; "The Principles of Bibliographic Citation" by John F. Fulton; "The Art of Communication" by Joseph Garland; "On Writing a History of Medicine" by Douglas Guthrie; and "Minerva and Aesculapius: The Physician as Writer" by Félix Martí-Ibáñez.

This 72 page Monograph is sold for $3.00. As the fourth in the series of MD International Symposia, this book is the companion piece of *Medical Writing*, which was published in May 1956.

To obtain this monograph, write to MD Publications, Inc., 30 East 60th Street, New York 22, N. Y.

Effectiveness of a New Agent in the Correction of Drug-Induced Constipation

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Treatment of the hypertensive cardiac patient has been facilitated in recent years by the introduction of various drugs, especially those classified as ganglionic blocking agents. These welcome additions, however, have created newer problems in management, since effective parasympatholysis often results in serious side effects (e.g., urinary retention, intestinal paralysis, vertigo).

Drugs that act to interrupt autonomic nerves (hexamethonium, pentolinium, chlorisondamine, and mecamylamine) have all been responsible for the development of undesirable side effects.[1–5] Most investigators agree with Schroeder and Perry[5] who state that bowel control poses the most stubborn and persistent problem in drug therapy of hypertension. The patient must not be permitted to become constipated, not only for his personal comfort, but mainly because the absorption of hypotensive agents is greatly dependent on the motility of the intestine. Since the drugs cause hypomotility, more is absorbed when the patient is constipated, and overdosage frequently occurs.[3, 6, 7] Paralytic ileus is a constant threat and steps must be instituted promptly to prevent it.[1] The need for frequent or even daily laxation has been generally advocated.[5–8]

An effective constipation corrective should restore intestinal motility, since constipation in hypertensive patients on a regimen of ganglionic blocking agents most frequently results from bowel atony. A new preparation of anthraquinoidal glycosides (Quinoplex*) was selected for trial because its action, which is believed to be mediated through Auerbach's plexus, would presumably aid in restoring normal colonic motility.[9–12]

This initial study was conducted on 30 patients in the outpatient clinic of a community hospital. The subjects were, in general, aging welfare patients whose overall physical condition was probably poorer than that of the general population. Poor nutrition, due to inadequate diet, poor dentition, and insufficient funds, lack of activity and poor muscle tone, and the familiar declining state of the aging all contributed to the clinical picture.

All patients had various degrees of hypertensive heart disease and were receiving ganglionic blocking agents either singly or in combination with meprobamate or one of the *Rauwolfia* alkaloids. Most of the patients could be classified as having hypertensive arteriosclerotic heart disease, and in many instances they were also receiving digitalis preparations and oral mercurial diuretics.

Constipation in all patients in this study was adequately controlled by adjusting

* The trade name of Gray Pharmaceutical Co., Inc., for a new preparation of anthraquinoidal glycosides is Quinoplex.

the dosage of the preparation of anthraquinoidal glycosides. In most patients 20 mg. (2 tablets) daily, taken at bedtime, was sufficient. Six patients required 30 mg. daily to remain free of constipation and 4 required 40 mg. daily. Only 1 patient required more than 40 mg. daily.

Side effects were few and mild, with only 6 patients reporting mild cramps. No one requested to be taken off the preparation. In most instances the mild cramps disappeared with continued therapy. Patients considered Quinoplex more effective and convenient than a variety of laxative agents formerly used. Loose stools or diarrhea was not observed during the study, even at the higher dosage levels required by some patients.

It is apparently necessary to continue administration of the effective dose of the drug as long as the ganglionic blocking agents are used, since constipation promptly returned on discontinuance of therapy. An attempt was made to reduce dosage to a maintenance level of 10 mg. daily, but this was ineffective.

CONCLUSIONS

Constipation is a constant side effect of drug therapy of hypertension with the various ganglionic blocking agents.

A new preparation of anthraquinoidal glycosides proved particularly effective in combating constipation. The majority of patients could be controlled on only 20 mg. (2 tablets) daily, at bedtime, while the remaining patients could be adequately controlled by increased dosage.

Side effects of a mild nature, and of only transient duration, occurred in a very small percentage of patients.

ACKNOWLEDGMENT

The preparation of anthraquinoidal glycosides used in this study was made available by the Medical Department of Gray Pharmaceutical Co., Newton, Mass.

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DISEASE CONTROL AND INTERNATIONAL TRAVEL. "The years since the Second World War have seen a dramatic decline in the extent and severity of the so-called 'quarantinable' diseases--chlorea, plague, typhus, relapsing fever, smallpox and yellow fever," states the World Health Organization Chronicle' in a review of the International Sanitary Regulations governing world-wide trade and traffic. Since the Regulations went into effect in October 1952, not a single epidemic of any of these diseases has occurred as a result of international travel.

AUTOMATICALLY CONTROLLED ARTIFICIAL RESPIRATOR BEING DEVELOPED. An artificial respirator that is automatically controlled by the concentration of carbon dioxide its user inhales is being developed through a project at Columbia University. The carbon dioxide concentration in the exhaled gases of the anesthetized patient's lung is measured by an infrared gas analyzer into which the patient breathes. When the carbon dioxide concentration in the exhaled air rises, the device raises the pressure at which the gases are delivered to the patient.

EFFECT OF MILITARY LIFE ON MINIMAL TUBERCULOSIS. Nine hundred and sixty-seven persons in military life who were found, after induction, to have minimal tuberculosis, either active or inactive, were followed up for an average of 52 months. The study was conducted to determine what happened to the disease under war conditions. Results published in the American Review of Tuberculosis and Pulmonary Diseases show that of those persons diagnosed as having active tuberculosis when first examined by the research group, 59 per cent were alive and well at the end of the observation period, in comparison with 77 per cent of those diagnosed as having apparently inactive disease.

SENSITIVITY TEST FOR ATARAXICS GOAL OF RESEARCH. Development of a sensitivity test for ataraxics is a prime goal of research scientists in the mental health field, according to Dr. J. J. Van Gasse, medical director of J. B. Roerig and Co. He pointed out that clinical evidence demonstrates that certain conditions respond best to one particular ataraxic, and without a specific test, a trial and error method of treatment often must be used until the optimum therapy is determined.

ALL THREE POLIOMYELITIS VIRUSES NOW CRYSTALLIZED. All three of the major poliomyelitis virus strains have now been

crystallized and purified, Dr. Carlton E. Schwerdt of the University of California Virus Laboratory reported. The physical properties of all three strains are similar. All are nucleoproteins of ribonucleic acid type. Chemical studies, limited so far to two strains, suggest detectable chemical differences between strains of different types.

POSTMATURITY FACTOR IN INFANT MORTALITY. Postmaturity is an important factor in relation to perinatal infant mortality, reported T. F. Corkill in the New Zealand Medical Journal. Its chief significance lies in an increasing tendency to anoxia more than in an increased risk of difficult, traumatic delivery. In a study of postmaturity based on 5000 patients seen between 1943 and 1954, the perinatal death rate was at its lowest in the fortieth and forty-first weeks, but rose considerably thereafter.

CYTOLOGIC SPUTUM EXAMINATION 88 PER CENT ACCURATE. Cytologic sputum examination is up to 88 per cent accurate in detecting pulmonary carcinoma and is particularly valuable in detecting early lesions, reported Dr. Seymour M. Farber, University of California. The technique's major value is that it indicates the presence of malignancy in clinically unsuspected cases. The findings were based on a series of more than 10,000 cases during a 12 year period.

ANTIBODIES MAY BE CAUSE OF CHRONIC THYROIDITIS. Chronic thyroiditis may be caused by autoantibodies directed against the thyroid gland. Such antibodies have been found in 5 of 12 patients with a history of chronic thyroiditis, reported Drs. Ernest Witebsky and Noel R. Rose, University of Buffalo. They observed that rabbits injected with antithyroid antibodies developed lesions resembling those of human thyroiditis.

ACCIDENTS CLAIM 95,000 LIVES IN 1956. Fatal accidents in the United States during 1956 took approximately 95,000 lives, statisticians of the Metropolitan Life Insurance Company reported. It was the second successive year in which the total increased, the rise being accounted for by an increase in fatalities from motor vehicle accidents, which numbered approximately 40,000 in 1956.

MORE BABIES BEING BORN IN HOSPITALS. More babies are being born in hospitals and with a physician in attendance than ever before, the Health Information Foundation reported. In 1935 only 37 per cent were born in hospitals and 13 per cent of all births were unattended by physicians. In 1956 almost 95 per cent were hospital-born, and physicians attended 97 per cent of all births.

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MEDICAL INSTRUMENTS SECTION*

Radioisotope Scanning Instrumentation

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A modern radioisotope scanner is a device developed primarily to obtain without surgical, traumatic, or inconvenient procedures an objective record of the morphologic distribution of active thyroid tissue. It has found many other applications but as yet none is used as widely as that of thyroid examinations. Ordinarily it is not feasible to obtain a radiograph of the thyroid gland despite attempts by some to do so by air insufflation methods. A radioisotope scan of the thyroid gland or displaced thyroid tissue in its present state of development does not begin to show detail comparable to that easily obtainable in ordinary radiographs of various parts of the body. However, much information can be obtained and recorded for later examination and study. The size and symmetry of the gland can be determined. If the gland is not in its normal position, e.g., if it is sublingual or intrathoracic, the scan readily demonstrates this condition. It is easy to determine whether a lobe has been completely or only partially removed by surgery. The existence of hyperactive nodules can frequently be demonstrated. Less frequently, hypoactive nodules can be observed, but occasionally the deformation of the gland by the pressure of an inactive growth can be detected. In cases of thyroid cancer, metastases of thyroid tissue can be located and followed during thyroid-stimulating hormone and radioiodine therapy. The weight of a hyperthyroid gland can be estimated much more closely than by palpation. The gland weight is one of the factors entering into the choice of the dose of radioiodine in the treatment of hyperthyroidism. The estimation of gland weight by scanning enables single dose treatment of diffuse hyperthyroidism with very little danger of overtreatment and the consequent necessity of the patient's taking thyroid preparations.

The possibility of obtaining a thyroid scan depends on the fact that active thyroid tissue will pick up radioactive iodine (I^{131}) introduced into the blood stream either by intravenous injection or, more conveniently, orally via intestinal absorption. The radioactive iodine accumulated in the gland or other active tissue emits both beta radiation and gamma radiation. The beta rays are locally absorbed in 1 or 2 mm. of tissue. The gamma radiation is sufficiently penetrating to escape from the tissues and be detected by a sensitive, highly collimated scintillation counter. The collimation has the effect of enabling the sensitive scintillation crystal to see just a

* The Medical Instruments Section will be featured in this journal during 1957. Outstanding authors have contributed articles to this series that will depict a panorama of the role of scientific instruments in clinical medicine.

small area of activity at any one time. Its response to the absorption of gamma rays coming from the area that it can see through the collimating channel is to produce a very feeble flash of light for each quantum of gamma radiation absorbed. The crystal, which is now usually thallium-activated sodium iodide, is transparent to the scintillation flashes. The crystal is coated with a highly reflecting white powder so that most of the light from a scintillation can eventually be diffusely reflected into the window of a photomultiplier tube in direct optical contact with one face of the crystal. The photomultiplier tube converts the optical flash into an electrical pulse and amplifies it tremendously by secondary electron emission. The amplified pulses are fed through a scaler, causing a printer to make a mark on a piece of paper after every preset number of pulses. Either the table on which this sheet of paper is held is scanned back and forth with the printer being stationary or the printer scans back and forth with the table and paper remaining stationary. Whichever element is the movable one, the scanning head, consisting of the collimator, sensitive crystal, photomultiplier tube, and shielding, moves along with it and scans over a preset area of the patient's neck or other part of the body.

The more activity the counter sees during its scanning motion, the faster the printer will make marks on the paper moving relatively to it. The net effect is that the printed marks are closer together in regions of higher activity, and a crude image of the distribution of activity is thereby produced.

It would be easy to design a scanning system to show much greater detail if it were permissible to use a considerably greater dose of I^{131} than is generally considered proper. With a single channel collimator, a scanning record showing minimum useful information can be obtained with about 50 μc. uptake in the gland and a scanning speed such that it takes about 20 minutes to cover the whole gland area. A converging collimator system has been designed and used that sacrifices some geometric resolution but can give almost as informative results with about 10 μc. in the gland and in about the same scanning speed. Use of a larger dose except in the actual treatment of hyperthyroidism or thyroid cancer can be subject to severe criticism until much more information becomes available on long term biologic hazards of the use of isotopes on human beings. More detail could be obtained if a longer scanning time were used. However, it becomes inconvenient to keep a patient immobilized much more than one-half hour, especially if he is hyperthyroid. Usually before a patient is scanned, thyroid uptake is measured. This can now be readily accomplished with a few microcuries of I^{131}. On the basis of the percentage of thyroid uptake measured, the administered scanning dose is chosen so that the gland will, after a suitable time interval, contain between 50 and 100 μc. The dose can be reduced if the afore-mentioned converging collimator is used. In fact, the dose can be reduced sufficiently that some institutions are making scans without prior uptake tests, although it should be remembered that at its present state of development the converging collimator does not give as good geometric resolution. However, it might well do so after suitable redesign.

There are presently available in the United States four commercial models of scanners. The first one in the field was the Scintiscanner.* More recent arrivals are

* Scintiscanners are manufactured by the Reed-Curtis Nuclear Industries, Culver City, California.

FIG. 1. The most recent Scintiscanner.

the Tracerscanner,* the Nuclear Scanner,† and the N.R.D. Scanner.‡ They are all the same in principle but differ in details of mechanical and electrical design. One of the most advanced models for convenience and reliability is the most recent Scintiscanner, shown in figure 1. The collimating counter head is shown over the patient's neck. The head scans over an easily preset area. The printer is seen over the center of the top of the cabinet. The printer scans over the paper held on the top surface of the cabinet. Some of the newer models of scanners have the advantage of having no legs to get in the way of bringing the patient under the scanning head. They are compact and fit easily in smaller offices. Figure 2 shows a photograph and diagram of the very first experimental scanner,[1] built at the U.C.L.A. Atomic Energy Project in 1950.

Some scanners use a spectrometer that can be adjusted to pass only a certain range of electronic pulse heights originating from the photomultiplier tube. Since these electronic pulse heights are proportional to the brightness of the light pulses in the crystal, and they in turn are proportional in a certain range to the quantum energies of the absorbed gamma rays, it is possible to reduce considerably the background

* Tracerscanners are manufactured by Tracerlab, Inc., Richmond, California.

† Nuclear Scanners are supplied by the Nuclear Instrument and Chemical Corporation, Chicago.

‡ N.R.D. Scanners are manufactured by the Nuclear Research and Development Company, St. Louis.

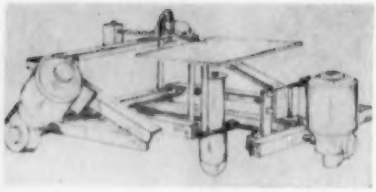

FIG. 2. Photograph and schematic diagram of the first experimental scanner. Controls and limit and reversing switches not shown in diagram.

count due to cosmic rays and natural radioactivity. Also, when a large volume or depth of activity is being scanned, it is possible to reduce the counts arising from scattered radiation from sources not seen by the collimated crystal. This is because scattering over a large enough angle will appreciably shift the quantum energy of the radiation so that it will not be in the right part of the pulse height spectrum to be passed by the spectrometer. Figure 1 shows the appearance of the so-called Oak Ridge spectrometer as installed in a scanner.

Another auxiliary device that has been developed and is being experimentally tried as an aid in improving the quality of scans is the electronic "contraster." This device can be set to subtract electronically a uniform level from the printed record. If a uniform background exists, it can be largely removed by setting the subtracting level to balance the background.

At the present time much effort is being put into the development of a true contrast amplifier. Kuhl et al[2] have shown that a photorecording technique can make objectively visible the presence of a brain tumor area. Several principles of nonlinear amplification can be used to increase contrast. One of the most useful is that of the extremely rapid increase in brightness of a hot filament lamp as the current is increased over a certain range. A lamp bulb current can be arranged so that the light output is doubled with only a 10 per cent increase in current through it. Also, the use of a high contrast photographic paper or film contributes to the contrast amplification. Roentgen-ray film has a very high density range but is too light-sensitive to be used unless it is completely enclosed during the scanning period. The development of suitable film cassettes for this application is in progress. It is hoped by many that with development of new techniques simple scanning methods will be used routinely for brain tumor scanning and for detecting liver tumors. This would greatly extend the usefulness of the scanning method.

Total body scanning for finding thyroid metastases has been tried experimentally. However, on thyroid cancer patients it is usually easy to locate areas of active thyroid metastases that have taken up I^{131} with a hand-held wide angle counter. Once a region is determined to contain activity, it can, if so desired, be scanned in detail with conventional scanning equipment working over a limited area.

Typical results obtained with scanners have appeared in many publications.[1-7] The very first thyroid scans ever obtained on human beings are shown in the *Nucleonics* article cited.[1] A collection of interesting scintigrams obtained from various sources has been published.[5]

It can be seen from this discussion that the scanning art in medicine is in its infancy. Much research must be done to obtain the maximum possibilities of clinical use. Fortunately, many medical research groups, collaborating with instrumentation biophysicists, are gradually making progress in these directions.

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Refresher Courses Scheduled

The following short refresher courses will be given at the Children's Hospital of Philadelphia in May and June 1957.

1. *Pediatric Advances for Pediatricians and General Practitioners.* May 27 through May 31, conducted by the Staff of the Children's Hospital of Philadelphia, in collaboration with the Department of Pediatrics of the University of Pennsylvania and the Staff of the Camden Municipal Hospital. Tuition—$110.00.

2. *Practical Pediatric Hematology.* June 3, 4, and 5, conducted by Irving J. Wolman, M.D., and other members of the Hematology Department of the Children's Hospital, under the auspices of the Graduate School of Medicine, University of Pennsylvania. Tuition—$75.00.

3. *Blood Group Incompatibilities and Erythroblastosis Fetalis.* June 6 and 7, conducted by Neva Abelson, M.D., and Thomas R. Boggs, Jr., M.D., of the Philadelphia Serum Exchange of the Children's Hospital of Philadelphia, under the auspices of the Graduate School of Medicine, University of Pennsylvania. Tuition—$50.00.

Inquiries should be addressed to Irving J. Wolman, M.D., Children's Hospital of Philadelphia, 1740 Bainbridge Street, Philadelphia 46, Pa.

ADVANCED REPORTS FROM CURRENT MEDICAL MEETINGS

This section of the INTERNATIONAL RECORD OF MEDICINE features reports on papers delivered at current medical meetings in the United States and abroad.

Stress and Action of Anticoagulants

Saskatoon, Saskatchewan, Canada.—Stress plays a role in the action of anticoagulants, report a group of University of Saskatchewan investigators. Working with animals, Julius Lowenthal, L. M. Fisher, and L. B. Jaques found a "significant" increase in hemorrhagic death when stress was induced after treatment with anticoagulants. Comparisons were made against control groups given only the drugs or subjected only to stress by various means—insulin shock, hypertonic saline, and frostbite. Both rats and rabbits were used.

An interesting finding was that in rabbits pretreated with anticoagulants that work indirectly, such as bishydroxycoumarin and phenylindanedione, mortality was elevated. This was not true with heparin, which has a direct effect on the clotting qualities of blood. Heparin, they comment, has been shown to interfere with some of the peripheral responses to stress.

(Presented before the sixth annual Symposium on Blood, Wayne University, Detroit, Jan. 18–19, 1957.)

Dormant Infections from Viruses in Childhood

Pittsburgh, Pa.—Many adult diseases of unknown etiology may be due to the invasion of the central nervous system, in childhood, by poliomyelitis or other viruses, speculates Jonas Salk (University of Pittsburgh). Childhood damage to the central nervous system, insufficient to manifest itself at the time, might make it impossible for the body to resist the stresses of later life, Dr. Salk suggests. He says that it is possible that some viruses, unlike the poliomyelitis virus, might remain dormant in the central nervous system for years, until activated by some stress.

The successful use of vaccine against poliomyelitis, Dr. Salk continues, in addition to preventing paralytic poliomyelitis might result in a reduction of many present orthopedic complaints of obscure origin. "Examples could include not only afflictions of the extremities, but scoliosis, low back weakness, or weakness in tone of the abdominal musculature," he says. "Such effects, conceivably due to greater or lesser damage of anterior horn cells, resulting from an attack upon cells in the central nervous system with incomplete recovery, in some instances might not be manifest except under circumstances of growth, aging, or other stresses. . . . It is known that severe hypertension and gastric or duodenal ulceration can occur as a result of certain types of damage to the central nervous system, and that poliomyelitis virus infections have produced such effects.

"Many other viruses invade the central nervous system," Dr. Salk notes. "There are those that are known to be the cause of common childhood diseases, and still other viruses are being recognized that can cause central nervous system syndromes simulating nonparalytic poliomyelitis." Dr. Salk asks, "Is it reasonable to consider the possibility that a mechanism might be operative in some virus infections of the central nervous system that is analogous to the way in which the spirochete of syphilis contributes to the causation of general paresis?"

(Presented before the Conference on Cellular Biology, Nucleic Acids, and Viruses, New York City, Jan. 7–9, 1957.)

Observations on Cardiac By-pass

Charleston, S. C.—Results of experiments in the use of a pump and bubble oxygenator, in which blood is drawn from the veins just before entering the heart and is pumped through an apparatus outside the body and oxygenated there, are reported by Edward F. Parker (Medical College of South Carolina, Charleston) and J. D. Ashmore and L. L. Brown. The blood is then returned by another pump to the arterial side of the circulatory system, thus by-passing both heart and lungs and allowing operations inside the heart.

Dr. Parker reports that the experiments were successful in accomplishing the objective and that the method was found to be practical for use in the human being. He says that after the experiments, the method was used in human beings with satisfactory results.

(Presented before the Southern Thoracic Surgical Association, Miami Beach, Fla., Dec. 7–9, 1956.)

Insulin Binding

Bronx, N. Y.—The administration of insulin to human subjects for a period of longer than three weeks provokes the elaboration of an antibody, which then binds the insulin, says Saul Berson (Chief, Radio Isotope Service, Veterans Administration Hospital, Bronx). Dr. Berson, in his studies utilizing insulin tagged with I^{131}, has shown that insulin-binding antibody is formed similarly in normal and diabetic subjects. After the intravenous administration of labeled insulin to a normal subject, the precipitable radioactivity of the serum rapidly decreases. When insulin has been given for a period of three weeks or longer, the rate of disappearance of the precipitable radioactivity is considerably slower, suggesting that the insulin is bound to a serum factor. The more insulin that has been previously given, the slower is the rate of disappearance of the radioactivity. Paper and starch block electrophoresis studies indicate that insulin is bound to a globulin fraction near the main mass of beta globulin, the "inter beta-gamma region." This insulin-binding globulin represents an antibody that can be recovered from Cohn's fractions I and III and that will inhibit liver insulinase activity. The data indicate that insulin is univalent and that the antibody is divalent in binding potentiality.

Insulin resistance in diabetics is due to the formation of antibody that may be capable of binding several thousand units of insulin. The insulin is gradually released from the antibody. Hypoglycemic manifestations, several days after the administration of large doses of insulin, are due to the delayed release of the hormone from the antibody.

Most of the insulin that is commercially available is a mixture of beef and pork insulin. Dr. Berson suggests that *it would be advisable for manufacturers to market only pure insulin from either source since, in the event of insulin resistance, one form could be readily substituted for the other.*

(Presented before the Mount Sinai Hospital Seminars on Diabetes and Nutrition, New York City, Jan. 9, 1957.)

Physical Working Capacity in Congenital Heart Disease

Stockholm, Sweden.—The physical working capacity has been studied in patients (mostly children) with congenital heart disease, report B. Jonsson and B. Strindberg (Department of Pediatrics, Karolinska Sjukhuset, Stockholm). The capacity was defined as the work the patient was able to perform at a pulse rate of 170 beats/minute. This was compared with the capacity in a control material correlated to the weight.

Patients with tetralogy of Fallot showed a low working capacity. Patients with isolated pulmonary stenosis had normal capacity if the pressure in the right ventricle did not exceed 100 mm. of mercury. In 1 case of coarctation of the aorta there was decreased capacity. Several patients with atrial septal defects had a normal capacity, also patients with a big shunt and a big heart.

Hemodynamic studies revealed that the shunt decreased at work. Patients with patent duct or ventricular septal defects had a decreased capacity if a high resistance had developed in the lesser circulation. The extra load on the right ventricle in long-standing cases finally results in a decreased capacity. Thus, the physical working capacity is of very limited value in determining the indications for surgery in most cases of congenital heart disease.

(Presented before the Swedish Pediatric Society Annual Meeting, Stockholm, Sweden, Dec. 8, 1956.)

The Effects of Radiation on Human Beings

Upton, N. Y.—A huge potential importance to the field of medicine lies in atomic radiation, points out Eugene P. Cronkite (Head, Division of Experimental Pathology, Brookhaven National Laboratory, Upton, N. Y.). This has both the positive and negative aspects of therapy and disease production. The former is well recognized in the treatment of neoplastic disease, metabolic disease, and in many phases of diagnosis. However, there still remains unanswered the huge and potentially great threat of atomic or nuclear radiation effects, acute and cumulative, in warfare or in peacetime.

In the range of dosage greater than 30,000 roentgens there is a syndrome characterized by convulsive death, known as the neuromuscular syndrome. From exposures of between 1000 and 30,000 roentgens, death is usually due to a shock that results from severe and intractable vomiting and diarrhea. This was seen frequently in Japan. The third syndrome occurs after irradiation in the range of 200 to 1000 roentgens and is marked by a pancytopenia that gives rise to the so-called hematopoietic syndrome. This syndrome is marked by the triple hazards of hemorrhage, anemia, and infection, the latter characterized by severe necrosis.

In an atomic bomb–irradiated population, there is an arbitrary division of the people that has the grim but realistic use of picking out those in whom therapy will have any use at all. Group I is that in which supralethal radiation makes survival improbable. In these persons the symptoms and signs follow rapidly and the total picture takes less than a week to culminate. There are prompt and pernicious vomiting and diarrhea. The patient is completely prostrate. He is affected with a rapid and profound leukopenia, dehydration and fever, and severe toxemia. There is no therapy and 100 per cent mortality. Group II is the 0 to 100 per cent lethal range and is known as the "survival possible" group. These persons are also marked by vomiting, but this regresses in a few hours and is milder in nature. After the first day all symptoms subside and there is a period in which the cells decline, in a dose-dependent fashion. This is known as the latent period, lasting one to three weeks. Then a recrudescence occurs with epilation, purpura, oropharyngeal lesions, infection, and gastrointestinal upset. Unless therapy is instituted, the mortality is 50 per cent. Group III is marked by sublethal radiation and is known as the "survival probable" group. In these persons the signs and symptoms are fleeting. There may be transient nausea and vomiting and serial blood changes.

It is obvious from our past experience, Dr. Cronkite states, that our main therapeutic tools at present lie in treatment of the hematopoietic imbalance and fluid therapy. Infections become a major hazard because of the following postradiation effects. There is a decrease in the neutrophils and a decrease in the ability of the remaining ones in mobility and phagocytosis. The reticuloendothelial system is less able to kill ingested bacteria; there is a decrease in antibody production. The resistance of the connective tissue is altered. Bleeding, the second great cause of death, is due almost entirely to a platelet defect and can be stopped by platelet transfusion.

The following are some of the rules that Dr. Cronkite feels must be followed in therapy of the irradiated patient. No generalized

prophylaxis should be used and each case must be individualized. Good nursing care and fluid therapy are of prime importance. If the neutrophils drop below 1000/cu. mm., then one must consider prophylaxis. This is also true in major catastrophe where adequate supervision may be lacking. In these cases tetracycline is probably most satisfactory, especially during the fourteenth to thirtieth days of maximum cell decrease. Blood should be administered only when indicated, and the threat of hepatitis is severe.

(Presented before the House Officers' Association, Boston City Hospital, Boston, Jan. 8, 1957.)

Rheumatoid Arthritis and Other Joint Disorders in the Aged

Innsbruck, Austria.—We should try to separate infectious from degenerative disorders in aged persons, though they may occur together and can be practically indistinguishable, says Professor Hittmair (Chief of Medical Service, University Hospital, Innsbruck). Osteoarthrosis occurs more frequently in later years, though not exclusively so. It affects mostly the weight-bearing joints, such as the hip and the lumbar spine. The typical osteoarthrosis patient is the short, stocky man. This habitus as well as a positive family history indicates the possible development of osteoarthrosis, and prophylactic measures can be started in time: such men should be advised by their physician to keep body weight low and to be active in sports, compensating for the strain borne by these joints. Roentgenographically, in 80 per cent of men older than 50 years osteoarthrosis is present, and 85 per cent of these have subjective symptoms at this age; 80 year old men almost all have positive roentgenographic findings.

There are forms of arthritis that occur only in women after the menopause. These are rare disorders, but it is important to consider them because estrogens bring about quick and complete cure in these otherwise refractory cases. Arthropathies developing after roentgen-ray castration belong in this category, as well as a form resembling rheumatoid arthritis, with gradual onset, extra-articular swelling, and finally the Sjögren syndrome: dryness of mouth and nose, conjunctivitis siccus, and joint pains. In contrast to osteoarthrosis, rheumatoid arthritis occurs mostly in women. It may begin at any age; the statement that it never begins after the age of 60 is certainly not true. There are many patients whose connective tissue still reacts at this age to streptococcal infection.

Cortisone is best given intra-articularly; for systemic treatment, dosage should be ascertained during a hospital stay. A strong untoward reaction after radioactive treatment suggests the presence of focal infection, provided the treatments were given in correct dosage. The importance of physical therapy in order to keep the joints movable is stressed. In arthritis (as well as osteoarthrosis) of the cervical spine, application of a Glisson sling for one to two hours often brings substantial relief. The patient sits in a chair at ease; the sling supporting his chin is attached to a nail in the wall over his head and weighted on its other side by a 3 Kg. weight.

Acute rheumatic arthritis seldom occurs after the age of 50, for it presupposes strong active resistance to infection. Chronic rheumatic arthritis may, of course, make its first appearance in later years. If, however, the patient had passed through the acute stage 10 or more years previously, it is more likely that he has osteoarthrosis.

In aged patients, unrelated diseases often produce symptoms simulating joint diseases. Deeply seated, nonpalpable varicose veins cause "rheumatic" leg pains; chronic obstipation may cause "lumbago." Low back pains radiating into both legs should suggest an extension of a carcinoma of the prostate; pains in the spine, of a metastasis or of senile osteoporosis, which may lead to infraction of a vertebral marginal plate. Hypertension may cause pains in the upper arms.

(Presented before the Austrian Geri-

atric Society, Linz, Austria, Dec. 15, 1956.)

Cryptococcosis (Torulosis) of the Central Nervous System

Paris, France.—Torulosis of the central nervous system is less rare than it might seem, state Theophile Alajouanine (Faculté de Medecine de Paris) and Georges Gasset (Assistant des Hopitaux de Paris). Its highest incidence is in the United States and Australia, but it occurs throughout the world, in all races. At all ages it affects a strikingly higher percentage of males than of females. Cortisone and the antibiotics seem capable, both experimentally and clinically, of favoring the disease.

Usually the clinical picture is that of a meningoencephalitis of subacute evolution. Cephalgia is the most constant symptom. Objectively, a meningeal syndrome is the rule; other neurologic signs are highly variable from case to case. Papillary edema occurs in 40 per cent of cases. Examination of the cephalorachidian fluid alone permits making the diagnosis. The fluid is under tension, with cellular elements (100 to 500/cu. mm.), high albumin level (0.40 to 2.50 Gm.), and yeast forms visible usually on direct examination but sometimes revealed only on culture.

In contrast to this early clinical picture, corresponding essentially, from the anatomic viewpoint, to a diffuse meningoencephalitis, is the picture in the much rarer, focal forms of the disease (less than 10 per cent of cases). According to the varying anatomic lesions, granulomas or pseudocysts, which involve the cerebral hemispheres, the cerebellum, or the spinal cord, the clinical symptomatology corresponds to the neurologic focus.

Pulmonary and cutaneous manifestations often accompany cryptococcosis of the central nervous system. They are related either to the portal of entry or to a process of dissemination of the parasite. In some cases, the disease takes on a septicemic character, with multiple foci of visceral involvement (renal, splenic) and positive hemoculture.

Diagnosis of cryptococcosis is ordinarily that of a meningeal syndrome of subacute evolution. Of course, tuberculous meningitis is suggested (25 per cent of cases). Very often, too, the diagnosis is that of an expansive encephalic or medullary lesion; in another one quarter of cases the initial diagnosis was brain abscess. Of course, other mycoses of the central nervous system may occur. The process evolves according to a highly variable pattern, but one thing is certain: the disease is always fatal. Usually it evolves steadily to its conclusion in a matter of a few months. Acute and even fulminant forms may occur. Chronic forms are more frequent, with remissions that may last as long as several months.

The anatomic lesions are of two types: meningeal lesions, predominantly at the base of the brain, invading the organ from the surface in depth, and deep neuraxic lesions appearing to result from hematogenous dissemination. In both cases the outstanding histologic characteristic is the discreteness of the inflammatory reactions; it is more usual to observe pseudocysts, composed of conglomerations of yeast cells, than true granulomas with important cellular afflux. In brief, the organism's reactions to the parasite are like those to a foreign body. There is no really effective treatment of cryptococcosis. An antibiotic completely active in vivo against *Cryptococcus neoformans* remains to be discovered. Doubtless, for want of something better, one can try pyretotherapy on the basis of the experimental fact that *Cryptococcus* cultures are sterilized by a temperature between 40.5 and 41 C. maintained for five to seven days.

(Presented before the meeting on Medical Mycology, Institut Pasteur, Paris, France, Dec. 14–15, 1956.)

Clinical Considerations of Acute Poliomyelitis

Louisville, Ky.—Children with a mild poliomyelitis infection may be better treated at home than at the hospital, suggests Alex J. Steigman (Chairman, Department of

Pediatrics, University of Louisville School of Medicine). Home treatment spares them the emotional shock of seeing more severe cases of pronounced paralysis, children in respirators, and similar sights. At home, a foot board and a board placed under the mattress, together with wearing shoes in bed, prevent foot drop and contractures.

In more severe hospitalized cases with bulbar involvement, tracheotomy should not be delayed until the situation is desperate or hopeless, Dr. Steigman advises. It should be done promptly if signs indicate that the patient's ventilatory condition is likely to deteriorate. Although this is difficult to determine with certainty, "if the idea that a tracheotomy may be necessary flashes through your mind, the chances are it is probably best to do it now," he says. Use of the respirator is better early than late, Dr. Steigman adds. The patient can always be removed if there is rapid improvement.

In the diagnosis of poliomyelitis, some of the less common complications of the acute stage are the thalamic pain syndrome with a crawling, burning sensation in the skin; convulsions, which are "not so rare in poliomyelitis as the textbooks say"; coarse tremors and actual athetosis; and encephalitis lethargica, a rather infrequent but significant manifestation. Convulsions occur also during convalescence and may be of the febrile, encephalitic, hypoxic, or hypertensive encephalopathy type. Dr. Steigman has found hypertension, usually (but not always) transitory, in 35 to 40 per cent of cases. Among the cardiovascular complications that are not always recognized, hypertensive disease is prominent. This may persist through convalescence and lead to renal disease. Cardiac arrest and central vasomotor collapse may also occur.

(Presented before the Medical Association of Puerto Rico, San Juan, Puerto Rico, Dec. 11–15, 1956.)

Digestive Manifestations of *Candida* Infections after Antibiotics

Paris, France.—Among the digestive complications due to antibiotics, the buccopharyngeal and the intestinal manifestations occupy an important place and have increased both in frequency and in gravity with use of the wide-spectrum antibiotics, state Andre Cornet and Pierre Barbier (Faculté de Medecine de Paris). Discovery by Hazen and Brown of the fungistatic agent nystatin seemed to cast light on the pathogenesis of these complications of antibiotic therapy. A study was therefore undertaken on the correction by nystatin of moniliasis appearing in the course of antibiotic therapy, comparing the clinical with the laboratory results. Almost all patients included in the study had acute respiratory diseases—pulmonary, bronchial, or upper respiratory.

Tetracycline was given in all cases by mouth, in doses varying from 1 to 1.5 Gm. In the first group (42 patients) tetracycline was given alone, in order to determine the percentage due to the antibiotic itself; the complications were glossitis, stomatitis, colitis, typical of mycotic infection. None of these patients received nystatin. A second group (7 patients) received first tetracycline, then nystatin. A third group (9 patients) received daily 1 Gm. tetracycline and 2 million units of nystatin.

Of the patients receiving tetracycline alone, 26 per cent had such complications as glossitis, colitis, anorectitis, and, more rarely, gastritis.

In all the subjects treated with tetracycline, and for whom a count of fungi in the stools was made, yeast cells appeared or increased whether or not clinical symptoms occurred. In all these cases administration of nystatin caused the yeast cells to disappear concurrently with regression of the clinical signs. Prophylactic treatment with nystatin associated with tetracycline averted the appearance of candidiasis or considerably reduced its gravity, even when the subjects had previously undergone antibiotic treatment.

(Presented before the meeting on Medical Mycology, Institut Pasteur, Paris, France, Dec. 14–15, 1956.)

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FOREWORD: A New Policy

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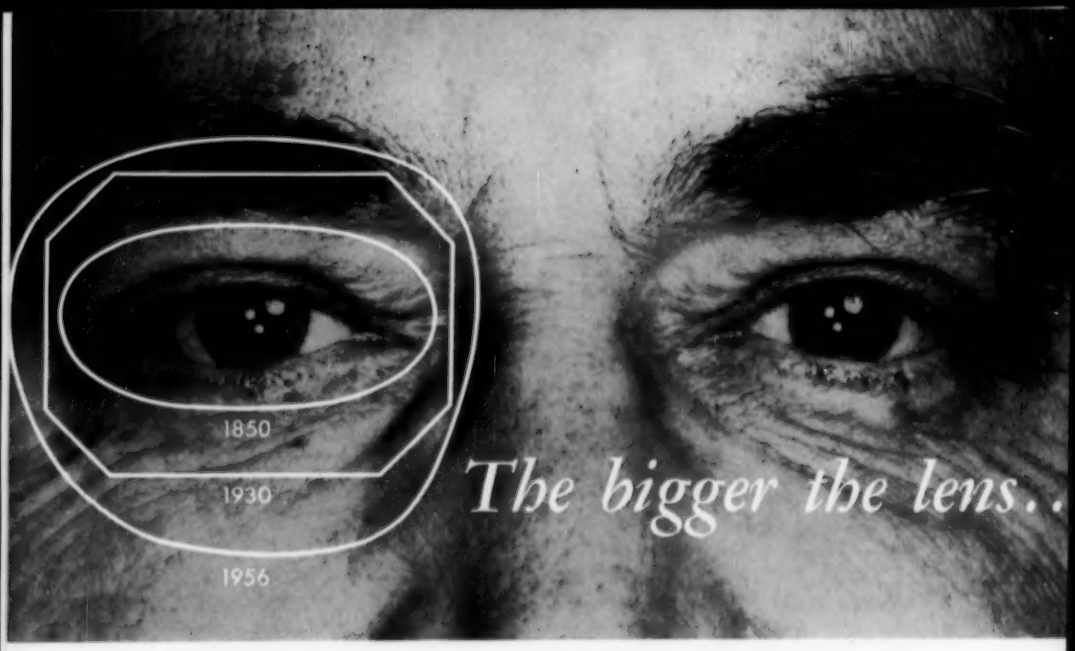

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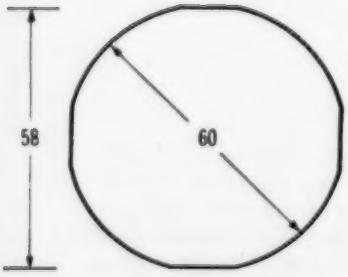

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Why Blindness?

An Australian Viewpoint

J. Ringland Anderson
MELBOURNE, AUSTRALIA

Few disorders are more disastrous than loss of sight, whether we consider it from the humanitarian or the economic point of view. The suffering and distress to patients and their relatives are immeasurable, and the cost to the country in pensions, allowances, and lowered national productivity is immense.

These facts are serious and some are obvious, but less apparent is the fact that most blindness is preventable, which has been well shown by various discoveries of the last few years. Blindness due to nonindustrial trauma ranked high in a Victoria, Australia, survey—viz., 14.4 per cent of monocular blindness. In the United States, blindness from injuries in children less than 7 years old fell 50 per cent between 1940 and 1950, but in adults blindness fell only 7 per cent.

RECENT EXAMPLES OF REDUCED INCIDENCE OF BLINDNESS IN AUSTRALIA

1. Of 192 blind pensioners in Queensland in 1937, 15 per cent suffered from lead poisoning; the majority of these lost their sight before they were 8 years old. Restrictions in the use of lead in paint accessible to children have eliminated this cause of blindness.

2. In the first half of 1941 Gregg of Sydney noticed an unusual number of infants with congenital cataract. In addition, the density of the central opacity and the association with cardiac defects and poor general condition attracted attention, suggesting that some disease of the mother during pregnancy might be responsible. There was congestion in the towns near military camps, and influenza and septic throats were prevalent; by a calculation from the date of birth of each baby it was estimated that the early period of pregnancy corresponded with the period of maximum intensity of the widespread epidemic of severe German measles in 1941. This discovery brought a new conception of the cause of congenital defects. It had been realized that measles, mumps, scarlet fever, and other exanthemata could be transmitted transplacentally, and Duke-Elder had written that it was conceivable that toxic or infective maternal processes might cause fetal lens defects. Proof of this had now been obtained. It is known now that typical rubella can be produced by inoculation of human volunteers by the respiratory route; in addition, the existence of unnoticed subclinical attacks has been stressed. The use of convalescent serum

for pregnant women exposed to rubella reduced the incidence to one tenth of that in one control series, and gamma globulin or pooled human serum may prove to be a prophylactic.

3. Cyanosis is the normal state of the fetus, and the change to a higher oxygen environment at birth is sudden but normal at full term. However, prematurity causes an edema that varies indirectly with weight. Campbell and Ryan recognized that oxygen therapy of premature infants so added to the toxic effect of the sudden change from cyanosis that vascular spoiling could cause blindness. Because of early recognition of this fact, only about 30 cases of retrolental fibroplasia occurred in Australia.

4. Ida Mann has carried out four surveys in Australia and New Guinea, and as a result of these, the main causes of blindness in certain vast areas have been recognized. The seriousness of trachoma has been revealed, and the measures adopted to combat this disease are already lessening blindness.*

MAIN CAUSES OF BLINDNESS IN THE MORE DENSELY POPULATED PARTS OF AUSTRALIA

Glaucoma. Few diseases are more insidious than so-called "simple glaucoma," and there is a large number of unrecognized cases. The surveys made in Philadelphia and Cleveland suggest that 2 per cent of the population more than 40 years of age in the United States have this disease; Berens and Tolman estimated that one million adult Americans have undiagnosed glaucoma. Of 10,500 adult industrial workers older than 40 years, more than 280 were found to have raised tension, and yet only 4 knew they had glaucoma.

Glaucoma caused 20.5 per cent of blindness among private patients in Victoria, 12.4 per cent in Tasmania, 2.6 per cent in the Kimberley district (where 24 per cent of those examined were Caucasians), and 1 per cent in New Guinea. It is of interest to note that vascular disease accounted for 9.5 per cent of binocular and 15.5 per cent of monocular blindness in Victoria. In Tasmania, where there is a slower pace of living, the figures were 6.0 and 5.2 per cent, respectively. In New Guinea, where almost primitive conditions prevail, none was found. The span of life is shorter in New Guinea and one would expect diseases of old age to be rare—unless, of course, the span prior to degeneration is also relatively short. The greater proportion of old persons in the former areas, however, only partially explains these findings. (See map.) Why should glaucoma cause 13.4 per cent of blindness in England, 11.6 per cent in the United States, and only 4.5 per cent in Norway, but

* The figures for Australian series are drawn from the following surveys. (A) Kimberley district of northwest Australia—general public, but 25 per cent Caucasians and 45 per cent less than 20 years of age. (B) Goldfields of western Australia—general public, but 50 per cent Caucasians and 66 per cent less than 20 years. (C) Tasmania—mainly private patients, 100 per cent Caucasians and 33 per cent less than 20 years. (D) Victoria—private patients, 100 per cent Caucasians and 33 per cent less than 20 years. (E) Queensland—blind pensioners, 100 per cent Caucasians. (F) Papua and New Guinea—general public, but 100 per cent Negroes and 44 per cent less than 20 years.

A, B, and F were carried out by Ida Mann, C by Hamilton (1941), E by Marks (1937), and D by the author (1939).

60 per cent in Iceland (Björnsson)? Eighty per cent of the last series, in which the wide angle type prevailed, had received surgical treatment, often too late.

The apathy of the general public concerning glaucoma is alarming. Their ignorance must be removed, and this task is our responsibility. The main fault is our failure to educate the public and to follow up our patients. In 81 patients in whom medical treatment failed, inadequate and improper prescriptions were the cause of failure in 16 and "misunderstandings" in 18 (Swan, 1953). In the United Kingdom (Sorsby, 1954),

FIG. 1. Map indicating varying percentage frequency of certain main causes of blindness in A—Kimberley district of western Australia, 149 blind among 2866 examined; in B—eastern goldfields of western Australia, 28 blind of 2203 examined; in C—Tasmania, 121 blind of 6770 examined; in D—Victoria, 275 blind of 12,240 private patients; in E—Queensland, 192 blind pensioners; in F—New Guinea, 96 blind of 13,268 examined. The figures in parentheses refer to monocular blindness. A, B, and F are from the surveys of Professor Ida Mann; C and D are from reports on blindness, almost entirely in private practice, by Bruce Hamilton and the author; E is from a report by E. O. Marks.

It is realized that the figures are not strictly comparable. Two thirds of those examined in survey B, 45 per cent of survey A, and 44 per cent of survey F were less than 20 years of age. Approximately one third of patients in C and D would be less than 20. Even if these differences are allowed for, there are significant variations in the frequency of the main causes of blindness.

Code: In. = Injury. Tr. = Trachoma. Gl. = Glaucoma. Vr. = Vascular disease. C. = Congenital and developmental anomalies. D. = Diabetes. A. = Amblyopia of strabismus. My. = Blindness from myopic degeneration. O.A. = Optic atrophy.

one third of patients blind with glaucoma had sought no treatment; on the other hand, however, the remaining two thirds had been under treatment. For this we must blame our poor use of the diagnostic and therapeutic methods rather than the methods themselves.

Many patients receive surgical treatment before medical methods are given an adequate trial. In many patients the glaucoma can be relieved by altered conditions at home and at work and by carefully arranged miotic therapy, thoroughly carried out. The general practitioner and the physician can help greatly, for much depends on the elimination of hurry, anxiety, and various excesses. *Glaucoma should be recognized as a medical disorder and its detection as the responsibility of the physician as well as of the ophthalmologist.*

Diabetes often complicates the treatment of glaucoma; in England only cataract, glaucoma, and myopia cause more blindness than diabetes. Thirty-nine per cent are blinded by it between the ages of 60 and 69 years, and more than twice as many women are affected as men. Diabetes caused 3.4 per cent of blindness in 1948 and 4.9 per cent in 1950 in England, 6.0 per cent in Tasmania, and at least 6.7 per cent in Victoria.

Trachoma. This disease was a major cause of blindness in Victoria until 40 years ago. It caused 3.6 per cent of blindness among private patients in a series surveyed in 1939—most of them older patients—and it caused 2.5 per cent in Tasmania. In 1955, however, it caused 16 per cent of blindness in New Guinea, and 60 per cent in the Kimberley district in 1953.

Although active trachoma is almost never seen now in Victoria, it affected 62 per cent of the patients with ocular disease in the Kimberleys, 64 per cent of the patients with ocular disease in southwest Australia, and 80 per cent of the patients with ocular disease in New Guinea. In contrast with this is the apparent rarity of this disease among American Negroes—causing only 0.3 per cent of blindness compared with at least 7.5 per cent in Caucasians. In the United Kingdom it caused 1.1 per cent of blindness and in Palestine 26.2 per cent (1937).

Is the apparent difference in racial receptivity that accounts for 81 per cent of infection among certain Arabs and only 4.4 per cent among the Negro group in Ethiopia due to an ancient immunity? Or is the cause a difference in hygiene? It has been suggested that in countries where trachoma is endemic, the high incidence of glaucoma is due to the influence of trachoma on ocular metabolism.

Congenital and Developmental Defects. Congenital and hereditary defects caused 37.3 per cent of blindness in the 1922 English series, but 67.6 per cent in the 1944 series (Sorsby, 1945). Similarly, in the United States they increased by 1.8 per cent from 1940 to 1950. There are two reasons why these defects are tending to increase. Blindness from infectious disease in the United States decreased by 7 per cent between 1940 and 1950, and as this cause declines in importance, congenital defects assume a relatively larger role. Also, in countries where such major causes as trachoma and glaucoma are small, these defects tend to gain importance as a cause of blindness. They caused 12.2 per cent of blindness in Victoria, where glaucoma caused 20.5 per cent and vascular disease 9.5 per cent, but caused 29 per cent in Tasmania, where these other two diseases combined were responsible for only 18.4 per cent.

The second cause of the apparent increase in congenital defects is less important. It is now realized that certain disorders due to genetic defects or the influence of prenatal environment may not appear until later life; secondary changes may obscure the initial genetic defect. Such defects are always included among the causes of blindness that will resist preventive measures. Between 1943 and 1950 "prenatal influence" was the cause of blindness in 37.5 per cent of 2412 children less than 7 in the United States; seventy-five per cent of 88 Swiss children suffered from congenital or inherited blindness (Sorsby, 1955). However, ocular defects indistinguishable from those of genetic origin may result from prenatal noxious agents. If a deficiency or an excess of vitamin or other element may be responsible for a congenital defect, there may be measures that have a beneficial effect.

An ocular trait depends as a rule on many genes. Though one gene or a few may be specific, the other genes and environment can influence the final product. Falls (1954) has shown that certain other genes or environmental action such as temperature may modify or inhibit the action of a specific gene, and geneticists predict a mutational effect of ever-increasing radioactive therapeusis.

Care during pregnancy is of great value in preventing congenital defects, vulnerability varying greatly from week to week with the particular cellular differentiation that is taking place. Unfortunately, the period of greatest danger coincides with the time when pregnancy has just begun, and greater care, particularly during the second month of pregnancy, could lessen blindness. The young mother, expectant mother, or wife could benefit greatly by knowledge of more facts, prevention of infection, and avoidance of operations, trauma, or excesses of various kinds.

Inheritance. As the defects due to maternal upsets are recognized, the importance of inheritance seems to lessen, but as recently as 10 years ago in the United States it was considered responsible for 15 per cent of blindness among children—and this figure is believed to be an underestimate. Prevention of blindness from this cause is difficult. Also, there are great risks in even distant consanguinity, for such a relationship may expose a recessive defect. Retinitis pigmentosa in a girl, for example, requires inheritance from both parents. *Physicians should study the different patterns of inheritance of genetic traits.*

Unknown Causes. Forty-seven per cent of 2412 blind children less than 7 in the United States (Berens, 1954) were blind from unknown causes; the lesions were choroidal and retinal. This group together with blindness due to prenatal influence (37 per cent), excluding rubella, toxoplasmosis, and venereal disease, caused 84 per cent of blindness among these children. This suggests that investigation was often inadequate.

The Cost of Blindness. Within a span of 13 years, 8000 infants were blinded from retrolental fibroplasia in the United States. Their lifetime cost to the country was estimated at eight hundred million dollars, and yet the research organization responsible for so much of the preventive work received only 51 thousand dollars from the government. According to Campbell and Ryan, there were only about 30 infants blinded by this cause in Australia. The cost to Australia will probably be over one million pounds, and yet the government contributed nothing to aid in the search for the cause.

Prevention of blindness among children would frequently lessen the associated mental defect. The waste due to blindness is enormous: In England 85 per cent of blind persons older than 13 were "unemployable." The total number of the blind is very great and can only be estimated, for there are many, particularly those with glaucoma, who do not apply for pensions. Also, the medical profession is largely responsible for lengthening the life span of man. This is leading to a greater frequency of blindness and may explain the increase of 14 per cent between 1940 and 1950 in the blindness rate in the United States. And in addition to the blind there are many who are near blindness. Blindness in Britain means 3/60 vision or less, and in the United States and Canada, the equivalent of 6/60 or less. However, much inefficiency and difficulty are caused by vision that is better than this.

We must emphasize that there is great need for redoubled efforts to find the causes and most efficient forms of treatment of ocular diseases.

EDITOR'S NOTE: For information concerning methods and equipment for the early detection of glaucoma as a routine part of every physical examination, address the Ophthalmological Foundation, 111 East 59th St., New York, N. Y.

National Committee Formed for Research in Ophthalmology and Blindness

A National Committee for Research in Ophthalmology and Blindness was recently formed by representatives from the four national ophthalmic societies. Members of the committee are: Bernard Becker, Washington University, and A. Edward Maumenee, Johns Hopkins University, representing the American Academy of Ophthalmology and Otolaryngology; Michael J. Hogan, University of California, and Albert D. Ruedemann, Sr., Wayne University, representing the American Medical Association, Section on Ophthalmology; Alson E. Braley, University of Iowa, and David G. Cogan, Harvard University, representing the American Ophthalmological Society; and Irving H. Leopold, University of Pennsylvania, and Frank W. Newell, University of Chicago, representing the Association for Research in Ophthalmology.

The committee plans to stimulate increased interest in ophthalmic research and to cooperate with and act as an advisory group to all persons and agencies interested in blindness, the prevention of blindness, vision, and research in the basic disciplines of ophthalmology.

Letter from Venezuela

Respected colleagues of North America:
Greetings from Venezuela!

I believe that English-speaking ophthalmologists may be interested in knowing what their Latin colleagues south of the Rio Grande are doing in ophthalmology. Certainly, with present communication facilities, there are hundreds of specialists who contribute to the scientific exchange with periodic visits to North or South America. But it is also true that a great majority of the profession remains unaware of, and therefore so indifferent toward, the scientific movement of other American regions.

Our northern colleagues surpass us greatly numerically, and without doubt, the knowledge of the specialty among general practitioners there has been more widespread for a long time. Nevertheless, since the first decades of this century the progress of ophthalmology in the Latin American countries has been gaining momentum and has been running parallel with progress in other branches of medical science.

In these various countries, there are every day more and more schools, departments, and hospitals dedicated to the study, teaching, and treatment of eye diseases and considerable activity in all fields related to ophthalmology. Suffice it to mention as examples the famous institutions in Chile, Argentina, Brazil, and Mexico.

As for my country, Venezuela, the practice of ophthalmology was connected with the practice of general medicine and exercised by physicians and surgeons until the last third of the past century, when Dr. Juan Cuello, distinguished surgeon who studied in Europe with von Graefe, Jaeger, and Mauthner, devoted himself to the exclusive practice of diseases of the eyes. The public service of ophthalmology, that is, the clinics and departments of ophthalmology in hospitals, began with the establishment of the Eye Service of the Vargas Hospital in Caracas in 1895. The official teaching of the specialty began with the creation of a Free Chair of Ophthalmology at the Central University of Venezuela in 1918, later reorganized, and incorporated into the regular premedical instruction in 1931.

From that date on and in keeping with the general development of the country, the progress of this specialty in Venezuela became very conspicuous, and it has since taken its place among the most distinguished branches of national medicine. Since then, the number of ophthalmologists has increased tenfold; ophthalmologic departments have been opened in many charitable institutions; in each of the other two universities in Venezuela, chairs were founded for instruction in basic ophthalmology as part of the medical study course, and in various hospitals and institutions of public service regular courses are given for special preparation of personnel.

The School of Caracas became famous because both in ophthalmologic instruction and in clinical service it became up-to-date within a few years and because in several

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This article is the first in a series featuring reports from ophthalmologists throughout the world.

special respects it excelled older and better endowed American schools. Moreover, the teaching of ophthalmology at Central University exercises a national influence in Venezuela in that its methods and techniques spread and rapidly become uniformly accepted throughout the country. Some of these advances are the following:

1936—Diathermocoagulation in its different forms and scleral resection for retinal separation. *1937*—Intracapsular extraction of cataract, usually with suction, by opening of the anterior chamber from outside to inside and with edge-to-edge sutures. *1951*—Omission of mydriatics in cataract surgery with suction. Simplification of suction apparatus. External dacryocystorhinostomy with dental drill. Better physiopathologic understanding of squints and, consequently, better surgical and orthoptic management.

Ophthalmologic societies were founded and meetings (Annual Scientific Conventions) were organized. At these meetings important papers were presented. Some of the 32 papers read at the Fourth National Ophthalmologic Convention, which met in Caracas in November 1956, were: "Ophthalmodynamometry and Arterial Hypertension"; "Endodiathermy in Retinal Separation"; "Retinoblastomas"; "Ophthalmologic Expert Opinion Adjusted to Venezuelan Legislation." At the same meeting the topic, "Symposium on the Causes of Blindness and General Census of the Blind in Venezuela," was selected for the next meeting.

In 1953, a session of the Intermediate Congress of the Pan-American Association of Ophthalmology took place in Caracas, with participation of some 200 ophthalmologists; this constituted a definite act of scientific and cultural exchange between the Americas.

During the Fifth Pan-American Congress of Ophthalmology, held in Santiago, Chile, Venezuela was honored by the selection of its capital, Caracas, as the site of the Sixth Congress, which will take place in January 1960. We have already nominated the organization committee, as well as the subcommittees or secretaries who are to take care of the organization of various sections of this Congress.

On October 22, 1956, we met with the Executive Director of our Association, Dr. Moacyr E. Alvaro, and we discussed the extent and date of the Congress, the general program, sections, and officers. We shall have at the Congress at least four guests of honor, chosen from among the great representatives of ophthalmologic science of our hemisphere.

All American ophthalmologists will be notified of the actions and decisions of the organization committee. In closing this letter, I may now say that we Venezuelans are most enthusiastic about the Ophthalmologic Congress of 1960 and hope to receive and entertain a large number of our fellow ophthalmologists from the North American continent.

José Manuel Espino
Caracas, Venezuela
March 1957
Translated by George Z. Carter, M.D.

Note: See announcement on Interim Congress of the Pan-American Association, p. 174.

Glaucoma

ANATOMY OF GLAUCOMA BETTER UNDERSTOOD IN PAST DECADE

During the past decade important advances have been made in our understanding of primary glaucoma although the etiology of the disease is still unknown. Recent investigations, particularly those of Ashton, have led to a revision of our concepts of the anatomy of the aqueous drainage channels in that these channels possess a complexity far greater than was previously realized. The development of two clinically applicable techniques for the determination of aqueous outflow has demonstrated that in most cases the elevated intraocular tension is due to an increased outflow resistance in the drainage channels. Although these two techniques, Grant's tonography and Goldman's fluorescein method, differ in underlying principle, it is significant that the results obtained with both methods are in essential agreement.

ACETAZOLAMIDE HELPS UNDERSTANDING OF AQUEOUS FLOW

Attention has also been redirected to the problem of aqueous secretion since Becker's use of the new drug acetazolamide (Diamox), a potent inhibitor of aqueous secretion. Apart from its therapeutic value, this drug is extremely useful as a research tool for the investigation of the complex basic problems of aqueous secretion. While the results to date are by no means conclusive, it is becoming apparent that a reappraisal of our views of aqueous secretion will be necessary.

FURTHER RESEARCH LIMITED BY LACK OF PATHOLOGIC MATERIAL

While these recent advances are indeed highly significant, they have at the same time uncovered new and seemingly more difficult problems. Important basic questions regarding the exact site and nature of the abnormal outflow resistance are as yet unanswered. Further research into these problems is at present limited to some extent by the inaccessibility of the aqueous drainage system for in vivo physiologic studies and the lack of enucleated globes with early glaucomatous changes for pathologic study.

Ralph Z. Levene, M.D.
New York, N. Y.

ABSTRACTS

CRYSTALLINE LENS

1. *Statistical Observations of Atom-Bomb Cataracts.* FUMIO KANDORI AND YOSHIYA MASUDA. Am. J. Ophth. *42*:212, August, 1956.

Among 435 atom bomb survivors, there were 116 cases of radiation cataract. The highest percentage of cataracts was among the younger patients. Patients retained good vision in spite of the cataracts. Vision was normal in more than 53.3 per cent of the cases. Slit-lamp examination showed mostly disc or dishlike opacities, with some doughnut, half doughnut, and, very rarely, irregular in shape at the posterior pole of the lens.

RETINA

2. *Retrolental Fibroplasia. Cooperative Study of Retrolental Fibroplasia and the Use of Oxygen.* V. EVERETT KINSEY. A.M.A. Arch. Ophth. *56*:482, October, 1956.

Of the factors considered, this controlled study showed conclusively that the length of time the premature infant is kept in an oxygen-enriched environment is the important factor in the production of retrolental fibroplasia. Limiting the duration in oxygen to that deemed necessary to meet frank clinical emergency was shown to be without effect on the survival rate of the premature infant.

For all practical purposes there is no concentration of oxygen in excess of that in air that is not associated with risk of developing retrolental fibroplasia.

Infants of multiple birth appear to be significantly more susceptible to retrolental fibroplasia than infants of single birth.

Recommendations are as follows. The length of time a premature infant, particularly an infant of multiple birth, is kept in an environment containing oxygen in concentrations in excess of that of air should be held to an absolute minimum, consistent with the clinical indications of anoxia. When oxygen therapy is clearly required, it should be prescribed on an hourly basis and the concentration should be kept as low as possible.

3. *Experimental Approach to the Pathogenesis of Retrolental Fibroplasia. The Effects of Gradual and of Rapid Transfer from Concentrated Oxygen to Normal Air on the Oxygen-induced Changes in the Eyes of Young Mice.* LARS J. GYLLENSTEN AND BO E. HELLSTRÖM, Stockholm, Sweden. Am. J. Ophth. *41*:619, April, 1956.

The effect of gradual lowering of the oxygen concentration on the oxygen-induced disease of the eyes of young mice has been studied by Dr. Gyllensten and Dr. Hellström and compared with frequency and intensity of the eye changes in animals in which the oxygen was rapidly withdrawn.

The gradual lowering of oxygen concentrations resulted in an initial retardation

of both normal and pathologic vascularization of the retina. After a prolonged observation, however, with a longer stay in air, this difference was no longer obvious.

Changes of hyaloid vessels, irregularities, and atrophies of retinal layers are not significantly influenced by the method of transfer to air.

The study does not support the view that oxygen-induced changes of the eyes of mice can be prevented by a process of weaning.

It is pointed out that although there are many similarities between the oxygen-induced changes of the mouse eye and the early pathology of retrolental fibroplasia, there are also many differences, especially concerning the final outcome of the respective diseases. Conclusions from animal experiments, including the influence of the process of weaning, should be drawn cautiously.

NEURO-OPHTHALMOLOGY, OPTIC NERVE, VISUAL PATHWAYS, CENTERS, AND VISUAL FIELDS

4. *Pseudo-papillites vasculaires.* J. FRANCOIS, G. VERRIEST, AND A. BARON, Gand, Belgium. Program of Société française d'ophtalmologie, Paris, May 6–10, 1956.

Vascular pseudopapillitis is the clinical picture resulting from the sudden occlusion of a nourishing vessel of the intra- or juxtabulbar part of the optic nerve. Histologic study of the affected optic nerve was performed in some instances, so the existence of this affection is proved. All symptoms (edema and later atrophy of the nerve head, diminution of central visual acuity, and fascicular perimetric defects) are identical to those of true papillitis, so that clinical differential diagnosis can be made only by the study of etiology and evolution. The etiology is usually arteriosclerosis or temporal arteritis. It is possible that diabetes mellitus, periarteritis nodosa, Raynaud's disease, and polycythemia vera can also be etiologic factors. The evolution is generally characterized by a sudden onset, definitive loss of useful vision, and, frequently, a subsequent similar picture in the other eye. The atrophy of the nerve head is of the primary rather than of the secondary type, and the retinal arteries may show sheathing. In the cases in which arteriosclerosis is the etiologic factor, hypertensive retinopathy and pathologic changes of electroencephalogram and electrocardiogram are usual. There is no effective therapy. 43 references. 10 figures.—*Author's abstract.*

5. *Ocular Considerations in Facial Paralysis.* R. F. COWAN. Canad. M. A. J. 75: 380–383, September, 1956.

The ocular complications of facial paralysis are epiphora, paralytic ectropion, and lagophthalmos. If the chorda tympani is involved, there is loss of taste in the anterior two thirds of the tongue. If the branch to the stapedius muscle is involved, there is hyperacousia. If the nerve is intact, the facial muscle will contract to either faradic or galvanic stimulation; if the nerve has degenerated but the muscle is intact, it will contract to galvanic stimulation only. When the muscle has degenerated, it will not contract to either current.

Supranuclear lesions may be divided into cortical lesions, internal capsule lesions, and interpeduncular space lesions. In all supranuclear lesions, there is no diminution of excitability of the facial nerve to faradic stimulation, and the reaction of degeneration in the muscles does not take place.

Nuclear and infranuclear lesions may be subdivided into pontine lesions, cerebellopontine angle lesions, petrous temporal bone lesions, and lesions in the stylomastoid foramen. If the lesion is in the pons, the trigeminal nerve may be involved and there may be loss of corneal sensation as well as facial paralysis.

Ocular treatment for supranuclear lesions is not necessary. For lower motor neuron lesions, certain points of care are essential.

1. The patient should be instructed in blotting the tears rather than wiping them. This is to prevent eversion of the punctum and paralytic entropion.
2. The patient should be instructed in moistening the cornea by "digital blinking."
3. The patient should also be given a bland ointment to use in that eye at night.

If recovery from a lower motor neuron lesion is delayed for months or years, a shield may be necessary over the eye or tarsorrhaphy may be indicated. If the paralysis lasts for a long time, the muscles of the face should be given electrical stimulation to prevent their undergoing the reaction of degeneration. If the lower motor neuron lesion is accompanied by an associated trigeminal lesion, particular care should be taken to protect the eye. 10 references.—*Clement McCulloch, M.D.*

ORBIT

6. *Early Treatment of Orbital Fractures.* BYRON SMITH AND J. M. CONVERSE, New York, N. Y. Presented to the American Academy of Ophthalmology and Oto-Laryngology, Chicago, Oct. 19, 1956.

The face is arbitrarily divided into three thirds; namely, the upper third, middle third, and lower third. The bones of the middle third contain the orbits. The middle third is bounded above by the supraorbital ridges and below by the inferior limits of the maxilla. Horizontally, the middle third of the face is divisible into the central portion or nasomaxillary complex and two lateral divisions. The lateral middle third consists of the lateral orbital bones and the zygomatic arch.

This paper is limited to the diagnosis, complications, and treatment of those fractures involving the lateral divisions of the middle third of the face. The simple fracture dislocation of the zygoma is described. Three methods of reduction are mentioned. As a rule this fracture requires no treatment beyond reduction.

Disappointment in the results of treatment of comminuted fractures by conventional methods led the authors to seek a method of open exploration and immediate bone grafting. The technique is described. Theories and exploration for the causes of diplopia and enophthalmos complicating fractures are expounded.

The occurrence and mechanism of internal orbital fractures without fracture of the orbital rim are exemplified. The authors believe that this so-called "blowout" fracture is secondary to transmission of external forces through the orbital contents. 10 references. 8 figures.—*Author's abstract.*

MEDICAL OPHTHALMOLOGY

7. *Coagulation sanguine et glaucome.* JEAN-MARIE DELAGE, JACQUES AUDET, AND HENRI PICHETTS. Union méd. du Canada *85*:525–528, 1956.

Coagulation of the blood and the effect of heparin on coagulation were tested in 27 cases of chronic glaucoma and 16 cases of acute glaucoma. Hypercoagulability was found in acute glaucoma, hypocoagulability in chronic glaucoma. 5 references. 2 tables.—*Clement McCulloch, M.D.*

8. *The APC Viruses.* H. L. ORMSBY. Mod. Med. Canada 2:127–138, May, 1956.

The APC agents are viruses of the respiratory tract, nonpathogenic for laboratory animals, heat labile, filterable, and resistant to antibiotics and ether. Nine human and two simian immunologic types have been reported. Type 8 has been assigned to the virus of epidemic keratoconjunctivitis. Inoculations of virus of several of the types have produced illness in human beings. Inoculations of inactivated type 3 virus have prevented illness in human beings.

The first outbreak of pharyngoconjunctival fever in North America occurred at Greeley, Colorado, in 1951. Some typical cases were seen in Toronto in 1951. In 1955, in the Toronto clinics, adults were seen with conjunctivitis, preauricular adenopathy, tearing, and photophobia. The virus was isolated on tissue culture and identified as type 3. In August 1955, children with pharyngoconjunctival fever were seen for the first time. In contrast to the adults, the systemic manifestations were severe. In an area neighboring a North Toronto swimming pool, 112 cases were found; 74 of the patients had been in the pool, and 31 had acquired the disease after other members of the family had been infected in the pool. Thirty isolations of virus have been made; the typing of these strains is not yet complete.

Epidemic keratoconjunctivitis first appeared in North America in 1945, on the west coast of the United States. In 1951, at Windsor, Ontario, 549 cases were seen. From 1951 to 1955, 4 cases from the Toronto area were studied. The virus was highly infectious, 2 of the patients having received it from a third.

Transmission occurs by droplet infection or in swimming pools. Outbreaks of infection tend to be epidemic in nature. A vaccine of type 3 APC has been developed. The symptomatology resulting from APC type 3 infection is different in adults and in children.—*Clement McCulloch, M.D.*

9. *Diabetic Retinopathy.* S. LERMAN. Canad. M. A. J. *75*:191–193, August, 1956.

Diabetic retinopathy presents a characteristic ophthalmoscopic picture. The typical pathologic finding is numerous minute saccular aneurysms related to the retinal vessels. These aneurysms are often thin-walled, but may show thickening and hyalinization. In the kidney, the hyaline nodules at the periphery of the glomerular tuft and hyaline strands between and surrounding the glomerular capillaries found by Kimmelsteil and Wilson are similar to the lesions in the eye.

Hypoinsulinism is not the sole metabolic disorder involved in diabetes mellitus.

There is an increased urinary 17-ketosteroid excretion in diabetics with retinopathy as compared with diabetics without retinopathy. There are several other clinical facts that would suggest that in patients with diabetic retinopathy, this steroid is formed in large amounts by the adrenal gland.

Both insulin and cortisone are involved in mucoid metabolism. Derangement in metabolism of these substances may be a factor in diabetic retinopathy. 34 references.—*Clement McCulloch, M.D.*

10. *Les altérations de l'oeil chez les pellagreux.* M. I. STANKOVIC, Belgrade, Yugoslavia. Program of Société française d'ophtalmologie, Paris, May 6–10, 1956.

For the past 200 years, many authors have been concerned with the problem of the pathogenesis of pellagra. Many studied changes in the eye in persons with pellagra, and in their conclusions, we have noted disagreement and opposing opinions. This led us to study the problem in our own area and to present our observations. In 1951 we had the opportunity to examine a large number of patients with pellagra (116) in Serbia and we were surprised at not being able to find proof of many statements of authors of other countries.

Before giving our results, we would like to point out several facts concerning feeding habits of this region. Nutrition is very poor, and depends in part on economic factors and in part on conservatism in the manner of choosing nourishment. According to Snajder, 55 per cent of the inhabitants receive less than 2000 calories a day and 23 per cent receive up to 2500 calories. Of these calories, 71.9 per cent are carbohydrates (corn flower).

In our patients, the pellagra was characterized by the classical skin manifestations, and also by changes on the tongue, genital organs, and anus, whereas manifestations on the digestive tract and especially the nervous system were very rare. Of our 116 patients, 44 had all the symptoms of a progressive stage of the disease, and in 72 the symptomatology was regressive. The duration of the disease ranged from one year to more than 10 years in our patients. Seventy-eight per cent were men and 22 per cent were women. They ranged in age from 4 months to 79 years. In 39 of our patients, the blood studies showed serious microcytic anemia. Serum protein value was low, as was the vitamin A value of the blood.

Visual acuity was normal in 87 per cent; there were eyelid changes in 6.8 per cent, nonspecific conjunctival changes in 42.1 per cent, corneal alterations in 11.2 per cent, and crystalline opacity in 12 per cent. Twelve patients had day blindness, there were Bitot's patches in 6 patients, and there was anemia in the bottom of the eye in 31 cases.

Based on our experience with 116 patients, we can say, in conclusion, that eye changes in these patients are rare and nonspecific. Most of them are changes of the conjunctiva or the cornea, but the clinical picture is so nonspecific that it is not possible to confirm that there is a direct relationship between these changes and the pellagra. Perhaps the disagreement that is found among authors of different countries involves the description of the changes; their frequent reappearance may be explained by the predominance of one of the factors that is the cause of a complex

clinical picture of pellagra in a particular place and that results from regional characteristics, endogenous and exogenous, in the different parts of the world. In any event, it seems to us that changes in the eye in persons with pellagra are nonspecific, nonpathognomonic, and, especially, much more rare than they are thought to be.

11. *Ophthalmic Problems in Diabetes.* LOUIS W. STATTI, Pittsburgh, Pa. Geriatrics *11*: 263–265, June, 1956.

There is no treatment for diabetic retinitis aside from the treatment of diabetes itself. It has been assumed that by maintaining a nearly normal blood sugar level, the hemorrhages and exudates will disappear or be absorbed. What really happens is that the retinal changes undergo periodic remission and exacerbations. Many ophthalmologists, including myself, are using rutin, ascorbic acid, hesperidin, vitamin P complex, and testosterone, but their value is highly problematic. There is no doubt that the patient who maintains good control of the disease at all times will present less problems than the patient who fails to control it. In some of the advanced cases associated with vascular disease, the treatment should be directed toward the vascular system as well as the diabetes itself.

The following conclusions may be drawn: (1) Rapid refractive changes may be the first subjective sign of diabetes. (2) Ocular paralysis with diplopia lasts two or three months, and then clears up completely. (3) New vessel formations on the iris surface (rubeosis iridis diabetica) are a serious complication and the prognosis is poor, both for vision and for retention of the globe. (4) Lens changes in the older diabetic are treated as ordinary senile cataracts with the same results. (5) Optic nerve changes (atrophy) are due to vascular changes rather than to increase in blood sugar. (6) The degree of diabetic retinopathy is related to the duration of the disease and not to its severity. Visual damage depends on macular involvement. (7) Treatment of the ocular complications of diabetes is the treatment of the diabetes itself. Proper dietary control and insulin regulation is the only effective treatment. (8) The physician who assumes the treatment of the diabetic must accept the responsibility of giving his patient not only the benefit of his experience but also the latest scientific and clinical knowledge available to him from all sources. 8 references. 3 tables.—*Author's abstract.*

12. *Prolonged Administration of Diamox in Glaucoma.* IRVING H. LEOPOLD AND PAUL L. CARMICHAEL, Philadelphia, Pennsylvania. Tr. Am. Acad. Ophth. *60*:210–214, March-April, 1956.

A study made of 111 eyes with chronic glaucoma previously inadequately controlled by miotics alone, or miotics and surgery alone, revealed that the pressure could be controlled for longer than six months and in some instances for almost two years by the addition of Diamox to the therapeutic regimen. Almost all the patients in the study had some of the undesirable side effects of the drug. However, a large percentage of them could be controlled comfortably on the agent with beneficial lowering of the intraocular pressure.

The undesirable side effects limited the use of the drug for individuals, particu-

larly elderly ones who were made drowsy and underweight individuals who hesitated because of the weight loss induced by anorexia associated with Diamox administration. The possibility of ocular damage and of damage to other tissues in which carbonic anhydrase is an important enzyme, following the prolonged use of Diamox, cannot be excluded by any of the studies performed. Renal colic was not an infrequent complication initially.

Failures were encountered with this agent that were due not only to untolerated side effects of the drug but also to inability to lower the intraocular pressure, although the majority of the cases studied in this group did respond for more than six months.

Diamox should be considered an agent that does not attack the basic fault in glaucoma, but that controls the pressure by reducing the inflow of fluid. Measures that will increase the outflow of aqueous humor must still be employed. Diamox may be used in chronic cases in which other measures have failed or in which, because of age, serious illness, or sensitivity, other agents and methods that will reduce the resistance to outflow of intraocular fluid cannot be employed. Anyone who employs this chronic form of therapy with Diamox should be well aware of the side effects and should keep the patient under close surveillance.—*Author's abstract.*

13. *Psychotherapy and the Ophthalmologist.* ERNEST A. RAPPAPORT, Chicago, Illinois. Eye, Ear, Nose & Throat Monthly 35:105–111, February, 1956.

Although ophthalmologists encounter psychosomatic disorders daily in their practice, few either realize their significance or fail completely to recognize them. Freud postulated that the eye has a dual function—it perceives not only the external world, but acts as the organ through which the person selects and evaluates sexual objects. Groddeck, Jelliffe, and Nolan Lewis have commented on the permanent anatomic damage the eye may suffer when the patient is in such severe psychic conflict that his eye disorder becomes physiologically irreversible. A case history of a 22 year old man with a vernal catarrh and chronic conjunctivitis is presented to illustrate dramatically the pathologic consequences of such conflict.

The ophthalmologist must rely on his experience, common sense, and knowledge of psychiatry in diagnosing a psychosomatic disorder. He must open-mindedly regard the patient as a total personality and not look compulsively for a purely organic cause of the disorder or try to fit the patient into a nonexistent textbook syndrome. But the specialist must also be aware that the patient may have sought his help precisely because he, too, seeks a physical cause for his trouble, and will resent any inference that his illness is emotional. Thus, the ophthalmologist can avoid resistance and yet practice concealed psychotherapy, all the while remaining within the confines of his specialty as regards diagnosis and treatment. This he can do by the wise use of placebos. Placebos cement the doctor-patient relationship until the patient is ready to cooperate actively and can be told the truth about his condition. The physician must be ever aware of his own limitations. Therefore, stress is placed on the liaison that should ideally be maintained between medical specialists and psychiatrists to avoid "wild psychotherapy," and enable the ophthalmologist ot carry on supervised psychotherapy. 8 references.—*Author's abstract.*

Questions and Answers

Q. *A 68 year old patient of mine has folds of skin above both upper lids. A consulting ophthalmologist suggested surgical excision of these folds. The patient is not interested in her cosmetic appearance, and I wonder whether there are any other indications for surgery?*

A. The described condition seems to be blepharochalasis. The skin hangs down like a pouch as a result of relaxation and loosening of its attachments. It exhibits fine wrinkles and dilated superficial vessels, which give it a reddish tinge. The condition is due to progressive atrophy of the epithelial and subepithelial layers of the skin. Disfigurement is the most obvious result. However, with progressive atrophic degeneration, the redundant fold of skin may overhang the cilia of the upper lid and cause it to droop. It may also partially cover the pupil, thus interfering with vision. The levator muscle may be unable to raise the unduly heavy lid and the frontalis is then put into action. The immediate result of this is wrinkling of the forehead, but sustained effort of the occipitofrontalis muscle to counteract excessive narrowing of the palpebral fissure frequently results in headaches.

If the intraocular tension is low, increased pressure of the lid may alter the shape of the cornea and thereby cause changes in refraction. These are some indications —other than cosmetic—for blepharochalasis surgery.

Q. *At what age does a myope become far-sighted?*

A. A healthy eye of healthy adults exhibits only minor changes in vision for distance up to the age of 45. After that and up to the age of 70 many, but not all, individuals exhibit absolute increase in hypermetropia, which amounts to between 0.25 and 2.5 diopters. This slow and gradual increase in hypermetropia is real and is due to physiologic changes in the crystalline lens and possibly the cornea. Applied to the eye of a myope, this would mean a slow and gradual decrease in myopia amounting to between 0.25 and 2.5 diopters. Therefore many, though not all, myopes whose refractive errors range from 0.25 to 2.5 diopters may become emmetropic or even hypermetropic at some time between the ages of 45 and 70 years.

Q. *Should a dressing be applied after the removal of a superficial corneal foreign body?*

A. To be safe—yes. There is never any certainty that the continuity of the superficial layers of the cornea has been disrupted unless a biomicroscopic slit lamp examination has been performed. Thus a potential portal of entry for infection may exist. If properly protected, corneal epithelium heals quickly. Application of a mild antiseptic drop is generally innocuous and usually beneficial.

If local anesthetic drops were used, light pressure dressing is a must because the anesthesia usually persists after the patient leaves the office and another foreign body may lodge in the cornea, unnoticed. In addition, because of the toxic effect

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Note: The editors invite your questions, which will be referred to leading ophthalmologists around the country for answering and reprinted in this section. Direct correspondence to George Z. Carter, M.D., Ophthalmological Foundation, 111 East 59th St., New York, N. Y.

of most local anesthetics, corneal epithelium heals more slowly and discomfort may appear as soon as the anesthesia wears off. The two latter complications can be obviated by the use of a light pressure dressing.

Q. *Is there any treatment that would speed up the absorption of a subconjunctival hemorrhage?*

A. Iced compresses are used for the first 24 hours to arrest bleeding and warm applications after that time to hasten absorption. Several authors reported that trypsin injected intramuscularly promotes resolution of subconjunctival hemorrhages. If possible, the cause of the hemorrhage should be ascertained by a check of the blood count, bleeding and clotting time, and capillary fragility. Most often the laboratory reports are negative and the etiology of the hemorrhage remains a mystery.

Q. *Is there any connection between hypertension and glaucoma?*

A. One of the theories of the mechanism of primary glaucoma suggests that it is a vascular disease. Arteriosclerosis and cardiovascular disease, as well as hypertension, were suggested by different research workers as causative factors. However, no parallelism between the incidence of vascular hypertension and increased intraocular pressure has been established and the two seem to be unrelated, at least according to our present-day knowledge.

Q. *A 19 year old girl suffers from headaches, especially annoying after prolonged use of the eyes for close work. She has 20/20 vision in each eye and was told that she does not need glasses. There is no systemic explanation for the headaches. How can the coincidence of headaches with close work be explained?*

A. There are many possible conditions of the visual apparatus that may cause headaches even when there is normal vision and there are no refractive errors warranting correction. One of them may be insufficiency of accommodation; another, muscle imbalance; another, convergence insufficiency. Careful study of the muscular apparatus of the eye may give the answer. Simple home exercises may often remedy the situation within a short time.

Q. *Can anticoagulants prevent thrombosis of retinal blood vessels?*

A. According to the most recent investigations, impending occlusions of retinal veins can be prevented in most patients by anticoagulant treatment. Of 14 such instances, preventive measures failed in only 1 case. Although recognition of the danger signals of an imminent occlusion at the earliest possible time is of paramount importance in its prevention, there are patients in whom the interval between the detection of the first subjective or objective premonitory symptoms and the initiation of the prophylactic therapy was as long as nine months. As a matter of fact, two of the longest intervals were found in patients in whom therapeutic results were perfect.

The importance of early detection of imminent venous occlusion cannot be overemphasized, for in a high percentage of patients involvement is bilateral. It is true that this detection is easier in patients already under ophthalmologic observation,

but members of the medical profession in other fields may contribute greatly to saving their patients' vision if they are particularly alert to note minor visual disturbances in patients with systemic diseases that increase susceptibility to occlusive phenomena.

Q. *Are colored halos seen around lights pathognomonic for glaucoma?*

A. No, they are not. Similar halos may occasionally be seen by patients with certain corneal dystrophies or cataractous changes in the lens. It is not easy to differentiate between these conditions solely on the basis of this one symptom. Only thorough ophthalmologic examination can determine the underlying cause. Some indications may be derived from the persistence of the halos. Whereas in patients with increased intraocular pressure halos appear only during periods of considerably elevated tension and disappear as soon as tension becomes lower, in other abovementioned conditions the halos persist, since they are due to a rather chronic or progressive process. However, even in the latter group changes may occur, depending on the varying size of the pupil.

Q. *A 52 year old man has been told by several ophthalmologists that he has a mature cataract in one eye while the other eye has a vision of 20/20. Up to this point all physicians were in total agreement. However, their opinions were diametrically opposite as to whether cataract extraction should be performed, and when. What is the present-day indication for monocular cataract surgery?*

A. Starting with the premise that the cataract in the first eye is mature, the following may be said: It is well known that mature cataracts frequently progress to hypermaturity. It has been the experience of recent years that hypermature cataracts may develop a "leak" in the capsule without noticeable openings. Through this "leak," softened lens substance escapes into the eyeball. This may bring about an allergic and/or toxic reaction that may endanger not only the eye with the mature cataract, but also the fellow eye when a cataract develops in that eye. Therefore, a trend is developing among ophthalmologists to extract a cataract, other factors being equal, not later than at the stage of maturity.

The other factor influencing the decision of many surgeons is the problem of the so-called cataract lens. In brief, if a patient was approximately emmetropic before the onset of cataract, the power of the lens that would give him best vision postoperatively would be between plus 10 and plus 12 diopters. If the fellow eye is emmetropic with a fairly normal vision, the image formed by the proper lens in the operated eye would be about 33 per cent larger than the image in the nonoperated eye. Such a difference is intolerable to fusion. Therefore, as long as spectacle lenses were used postoperatively, patients would rather disregard them and use only the nonoperated eye until its vision became greatly impaired. For that reason many ophthalmologists waited with extraction of monocular cataract until the vision of the fellow eye was so greatly impaired that surgery became unavoidable.

With the development of the postcataract contact lens, complete reversal in this policy has become possible in recent years. With the contact lenses the difference between the size of images in the two eyes is negligible, and binocular vision is as

good as it was preoperatively in a great majority of patients. In brief, the monocular cataract should be operated on, and binocular vision can be obtained by the use of contact lenses.

Q. *How early in life should a child be referred for ophthalmologic examination?*

A. The earlier the better. Although ocular movements are aimless at birth, binocular reflexes can be noticed as early as the second or third week of life and are gradually more firmly grounded. In addition to this passage-of-time factor, binocular reflexes depend on usage for their development. The younger the infant, the less distinction between the normal and abnormal usage. Any obstacles in the path of the developing reflexes result in the development of an abnormal reflex. These abnormal reflexes approach a fixed standard at 2 or 3 years, and many of them become almost unchangeable (incurable) after the age of 5 or 6.

If a squinting child is seen early, there is a better chance for prevention of formation of these abnormal reflexes as well as for their modification and correction by forcing the children to proper usage of their eyes by orthoptic and later, if necessary, surgical means. Arbitrarily, the age of 6 months is none too early for the initial ophthalmologic evaluation.

George Z. Carter, M.D.
New York, N. Y.

XVIIIth International Ophthalmological Congress

The XVIIIth International Ophthalmological Congress will be held in Brussels Sept. 8 to 12, 1958, under the presidency of Professor Léon Coppez. The Congress will celebrate the centennial anniversary of its first meeting in 1857.

The International Council of the Congress has chosen as its main subjects (1) Orthoptic Treatment of Concomitant Strabismus and (2) Geriatrics in Ophthalmology. Symposia will also be organized on cataract, radioisotopes in ophthalmology, electroretinography, and glaucoma. There will also be sessions for free communications.

The International Association for Prevention of Blindness and the International Organization Against Trachoma will hold meetings during the Congress.

Inquiries may be addressed to the General Secretary, Professor Jules Francois, 15, Place de Smet de Naeyer, Ghent, Belgium.

CASE REPORT

Epidemic Keratoconjunctivitis

A 44 year old white man was seen in the office complaining of tearing, redness, and itching of both eyes of one week's duration. In addition, he had had blurred vision, photophobia, and a scant discharge.

Examination revealed edema of the eyelids and extreme redness of the bulbar and palpebral conjunctiva with numerous small follicles on the latter. The slit lamp revealed many superficial opacities of the cornea that stained faintly with 2 per cent fluorescein. The preauricular nodes were palpable, tender, and enlarged. The right eye was involved more than the left. The uncorrected visual acuity was 20/40 in the right eye and 20/20-1 in the left eye. The rest of the eye examination revealed nothing of significance. Smears and scrapings were taken and revealed no inclusion bodies and a few mononuclear cells and fragmented polymorphonuclear leukocytes.

A diagnosis of acute keratoconjunctivitis was made. Treatment was instituted consisting of chloramphenicol (Chloromycetin*) ophthalmic solution, 0.5 per cent in each eye every three hours, bacitracin-polymyxin (Polysporin†) ophthalmic ointment at bedtime, and cold compresses locally; also, the patient was instructed to take precautions against the spread of the condition, for it is usually contagious. The patient was seen daily and showed only slight improvement after four days. Gamma globulin, 5 cc. intramuscularly into each buttock, was then given. This was followed by rapid improvement, so that the patient was able to return to work five days later. When he was last seen, three months after the onset of the eye complaint, he had no residual scarring of the cornea and his vision was 20/15 in each eye. Often however, the superficial corneal scarring persists for many months but eventually this disappears.

COMMENT

Epidemic keratoconjunctivitis is an acute follicular conjunctivitis with preauricular lymphadenopathy. The corneal involvement differentiates it from the other follicular infections of the conjunctiva. Etiologically it is caused by a variety of viruses, as viruses of the APC group, herpes simplex, and a variant of St. Louis encephalitis virus have been isolated from individual cases. More properly, the symptom complex of follicular conjunctivitis, superficial punctate keratitis, and preauricular lymphadenopathy should be called acute keratoconjunctivitis, as it occurs endemically and sporadically. As no effective antiviral agents are yet available, it is rational to use immune globulin in the therapy of the more severe cases of this disease.

Dahar Cury, M.D.
Huntington Park, Calif.

EDITOR'S NOTE: This section will be devoted to case histories of typical daily problems in the eye field. It is designed to help the reader toward a better understanding of diagnoses and treatment in ophthalmology.

* The trade name of Parke, Davis & Co. for chloramphenicol is Chloromycetin.

† The trade name of Burroughs Wellcome & Co., Inc., for bacitracin-polymyxin ointment is Polysporin.

News and Notes in Ophthalmology

The IV Interim Congress of the Pan-American Association of Ophthalmology will be held jointly with the annual meeting of the National Society for the Prevention of Blindness at the Hotel Statler in New York, April 7–10. Three symposia have been arranged by the Program Committee for the sessions. The topics are: Diseases of the Ocular Fundus, Ophthalmic Surgery, and Therapeutics in Present Day Ophthalmology. In addition, there will be free papers, a scientific movie program, scientific and technical exhibits, and surgical clinics in various hospitals around New York.

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Recent grants totaling $26,500 for 10 eye research projects have been announced by the National Society for the Prevention of Blindness. The awards are as follows: Dr. Arnall Patz, Baltimore, $5000, retrolental fibroplasia; New York Eye and Ear Infirmary, $2000, electrophysiology of the eye; University of Nebraska Medical School, Omaha, $4000, adrenocorticoid function in relation to diabetic retinitis; Wills Eye Hospital, Philadelphia, $3000, choroidal circulation; New York University-Bellevue Post Graduate Medical School, $2000, pancreatic dornase in inflammatory ocular exudates; Washington University School of Medicine, St. Louis, $2500, photocoagulation of the retina; Albert Einstein College of Medicine, New York, $1000, fields of vision studies; Medical College of Georgia, Augusta, $2000, bacteriology of uveitis; University of Chicago, Department of Pharmacology, $2500, synthesis of carbon-14 and sulphur-35 radioactively labeled Diamox; Beth Israel Hospital and Massachusetts Eye and Ear Infirmary, Boston, $1500, development of effective apparatus to test vision in early infancy by means of opticokinetic response.

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Gill Memorial Eye, Ear and Throat Hospital, in Roanoke, Virginia, will hold its 30th Annual Spring Congress in Ophthalmology and Otolaryngology and allied specialities April 1 through 6.

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The Virginia Society of Ophthalmology and Otolaryngology recently elected the following officers: Dr. L. Benjamin Sheppard, Richmond, president; Dr. Emanuel U. Wallerstein, Richmond, president-elect; Dr. Calvin T. Burton, Roanoke, vice-president; and Dr. Maynard P. Smith, Richmond, secretary-treasurer.

■

On March 18–20 the Third Biennial Postgraduate Course in Ophthalmology will be held at Walter Reed Army Medical Center, Washington, D. C. From 3000 to 4000 leaders in the field are expected to participate in the program, which is being held in conjunction with the Sectional Meeting of the American College of Surgeons. Topics to be covered in the postgraduate course range from corneal transplantation to glaucoma to cataract surgery. Papers reflecting the latest concepts in diagnosis, treatment, and care of patients will be delivered.

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